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ABSTRACT

This report contains a discussion of a classification and attention training program for Head Start children. Chapter One presents the theoretical background of the project, which is based on Piaget's model of attention and classification. The methods used in the program are explained in Chapter Two. The next chapter discusses curriculum development and program implementation. Chapter Four provides results. Implication for Education, Chapter Five, concludes this report. Briefly, some of the results of this project include: (1) the cognitively based structured curricula produced greater gains in Head Start children than the less structured programs; (2) differential cognitive changes were demonstrated relative to curricular input; and (3) attention training produced lower gains than the classification program. (KJ)

Research and Evaluation Papers of the

Head Start Evaluation and Research Center

Project Report
May 1970

MICHIGAN STATE UNIVERSITY
COLLEGE OF HOME ECONOMICS
in conjunction with the
MERRILL-PALMER INSTITUTE

A CLASSIFICATION AND ATTENTION TRAINING PROGRAM FOR HEAD START CHILDREN

Michigan State University
Merrill-Palmer Institute

in cooperation with
Detroit, Michigan, Public School System
Pontiac, Michigan, OEO Community Action Program

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An Experimental Head Start Program of Curriculum Intervention

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INTRODUCTION

In several earlier studies, Sigel found that cognitive skills of lower class children could be modified by teaching them principles of multiple classification. The ability to perform multiple classification of a group of objects depends upon the cognitive act of decentration, the ability to abstract qualities of the perceptual given and then to shift point of view. "Children increased in their capability for articulating the rationale for groupings. . . after training" (Sigel and Olmsted, 1967, 1968). Moreover, a follow-up study done a year later indicated that some of the training effects remained operative. The importance of classification ability in the developing child is that it is considered a necessary step in the later development of all rational activity.

One surprising result of Sigel's 1968 study was that classification training did not induce conservation of mass and number -- the next sequential step in cognitive development -- in these disadvantaged children as it apparently had in a similar program with advantaged children (Sigel and Hooper, 1969). This finding is of particular importance to the research to be reported here, since there is now ample evidence that training programs focusing on prerequisites for relevant cognitive operations influence the resultant cognitive structures of middle class pupils. Does this also occur in lower class children, or, as suggested in the study above, are there other factors in the developmental background of advantaged children which interact with training to influence the acquisition of subsequent cognitive skills in the Piagetian sequence? This question is a key theoretical issue of this study.

Two other questions of immediate practical importance are also raised. Given that the training program developed by Sigel and associates positively modified the cognitive skills of lower class children, can the materials be adapted for children averaging one year younger than those in the earlier experimental groups without losing the character of the training? And, assuming development of appropriate teaching materials, can the program be effectively operated by regularly employed Head Start teachers? In all prior research, training was done by research assistants who had some measure of vested interest in the success of the training since they had participated in developing the materials and rationale for the instructional program. As much experience has indicated, results obtained under these conditions often are not replicable in true field situations. Thus, the purposes of this study are twofold. The first, by replication, is to find out if training in a precursor experience for a cognitive skill influences the development of that skill. Second, can a training program of practical value be designed to help Head Start pupils develop classification skills?

To begin answering these questions, two training programs were developed, based in part on ideas and materials from the prior training studies. These two programs have been designed as Attention and Classification. In Piaget's developmental sequence of cognition, the ability to center, or attend to the perceptual attributes of an object, is the precursor skill to the ability of classification. Classification requires, in addition, the skill of decentering, i.e., abstracting separate qualities of the object, and grouping a number of objects according to these qualities. The Attention training program deals exclusively with attending to the perceptual details

of the objects. The Classification program, while inherently including attentional training, deals with the multiplicative ways the objects of study can be categorized.

CHAPTER I

THEORETICAL BACKGROUND

Educational programs are frequently criticized for their lack of theoretical or conceptual base. Opportunities for creation of theoretically based programs are rare, since it usually requires extra funding, interest and commitment on the part of administrators and teachers, and a research team interested in field testing. This report will be a description of a field study that is theoretically based, did have the good fortune to be adequately financed, administratively supported, and teacher committed.

The conceptual base of this project derives broadly speaking from two strands of research: (1) the work on cognitive style, and (2) the work on classification, essentially Piagetian based.

The cognitive style research focused on individual differences expressed in modes of classification employed by children and adults. It was found that individuals, ranging from preschoolers to young adults, showed preferred modes of classifying representational or non-representational (e.g., geometric shapes, color) items whether presented with two or three dimensional material. (Kagan, Moss, Sigel, 1963; Sigel, 1963; Sigel & McBane, 1967; and Sigel & Olmsted, In press).

The fact that children employed various criteria for grouping raised the question of the significance of such performance. A series of investigations with various aged respondents revealed that particular styles of categorization related to intellectual and personality variables. Thus, it was concluded that style of categorization interacts with personality and intellectual variables.

These results suggest that categorization behavior reflects more than intellectual ability to solve classification problems. (Sigel, 1964). Rather, the criteria selected as the basis of classification may well be non-logical as well as logical reflecting interests and preferences of a personal nature. For some individuals, selection of physical-descriptive dimensions may be the categorization of choice, while for others, an inferential approach may be selected. In either case, the response is in grouping the items according to some value statement. This is not to say that alternatives are not possible, or to put it another way, to say that if requested, the respondent could arrange the items and create other groupings based on other criteria.

Such behaviors are possible because of two conditions: first, all items are multi-dimensional thereby allowing for a variety of possible criteria as bases of grouping. For example, an apple can be classified on the basis of its shape--round; color--red or yellow or green, etc.; function--food; class membership--which could be food, fruit. And this list is by no means exhausted. Each attribute listed is a legitimate criterion by which to create a group. Secondly, the "choice" as indicated previously is due to personal-social-intellectual interests, since individuals do establish preferred modes of responding.

Performance on tests aimed at eliciting styles of categorization requires that the respondent comprehend the instructions--in essence, understanding the principle of <u>rational</u> groupings. Guided by this principle, we were interested in identifying "grouping" capabilities and "style" of grouping in children varying in age, social class, and race (Sigel and McBane, 1967).

We investigated social class and age differences in performance with lower SES children, especially black children, since it was found in previous work that they had difficulty in grouping representational material, in shifting criteria, and tend to organize material in terms of subjective criteria--personal experience (Sigel, Anderson & Shapiro, 1966).

The significance of these results resides in the theoretical position one takes regarding the role of the classification in cognitive development and function. Piagetian theory of intellectual growth is one of the major theoretical positions which directs its attention to the role of classification skills. For Piaget, classification skills are part and parcel of logical thought and so are a necessary and sufficient prerequisite for logical thinking. One type of logical problem is that of conservation, i.e., the awareness that certain properties, e.g., mass, weight, number remain invariant in the face of certain transformations, e.g., changing shape, displacements, etc. A pint of milk is still a pint of milk whether it is in a tall glass or a short one; the weight of a ball of clay remains the same in spite of altering its shape.

Acquisition of conservation problem solving skills is presumed to require acquisition of classification skills. This idea has been tested in a series of studies with middle class preschool and kindergarten children. It was found that training children in classification skills did facilitate the solution of conservation problems involving number, mass, and weight (Sigel, Roeper, Hooper, 1966).

In classification training, the children are asked to identify objects and their manifold attributes, focusing on the polydimensionality of objects,

and the awareness that any one or more of these attributes may be used as a criterion for grouping. The child is encouraged to decenter and shift from one attribute to another. Children with such training employ a wider array of criteria for grouping as compared to children not having had experience (Sigel and Olmsted, 1967, 1970). The classification training program is a guided discovery approach.

Conservation resulted from training children to comprehend through performance on seriation, reversibility, and multiple classification tasks. (Sigel, Roeper, Hooper, 1966). Subsequent pilot work demonstrated that classification training alone, at least for preschool children, did appear to relate to solution of conservation of mass and number.

These results were questioned by John Watson who argued that alternative explanations for solutions to conservation tasks could be offered. In a very thoughtful paper, (Watson, 1968), Dr. Watson offered an S-R explanation in which learning to conserve can be accomplished by training children to "discriminate complex time - distributed stimuli." Watson analyzes the Sigel, Roeper, Hooper training study as being in effect, "a rather good shaping sequence for augmenting skills in the discrimination of time-distributed stimuli." (Watson, 1968, p. 458). Further, the child has to retain the previous state of the item in a conservation task. In effect, Watson argues that children's performance in conservation can be explained by a discrimination-memory model. He suggests that the test for this interpretation is the constructing of an experiment which employs discrimination and memory over time distributed stimuli and avoids classification and reversibility.

An example of this is given by Watson as follows: "The young 'non-conserving' child might initially be introduced to a simple discrimination problem in which a specified response (perhaps, though not necessarily, a verbal response) would be rewarded when it followed a 'positive' blue light stimulus but not when it followed a 'negative' red-then-blue light stimulus. Mastery of this problem would require that, among other things, the subject attend to the antecedent context of the blue stimulus light. To insure that the task was not being solved by the subject simply learning to inhibit the response following the red stimulus, one could later introduce the requirement that the response follow either red-then-red or yellow-then-blue, but not red-then-blue. Later, positive discriminative stimuli might be embedded in varying positions within a longer stimulus series and perhaps one could introduce longer and more complex stimuli for the required discrimination."

The theorizing of Watson occurred during the planning phase of the Shantz-Sigel conservation training study. In that study, then, two training conditions were created following Watson's analysis: (1) the classification model, and (2) the discrimination model. In the classification training, the children were provided with a guided discovery approach in which familiar items were provided for a variety of classificatory exercises. The children, in a group session identified the various physical and inferred attributes of objects, built conventional classes, recombined items into novel classes varying in size, etc. Children confronted each other when in doubt about the justification of the grouping. Extensive and intensive groupings were made by the teacher and the children asked to explain the basis of grouping.

This training experience involved active grouping behavior where a search was made for criterial attributes as bases for grouping.

The discrimination memory training involved a series of exercises in discrimination of attributes, memory tasks involving memory of body movements (time distributed) pictorial material and stories - each of which required the child to retain material in a given sequence. Never were children asked to classify or identify logical similarities.

After these training studies, the children, who originally were identified as non-conservers, were readministered conservation tasks - number, mass, area. No significant differences in conservation problem-solving behavior were found between the two training conditions.

These results, while lending support to Watson's analysis, do not deny the validity of the impact of classification training. Each training program contributes to acquisition of conservation. The significance of these programs for a particular cognitive outcome is clear.

What is not clear, however, is the explanation of the effect of each of these problems. The following question can be asked: Is there overlap between the two procedures sufficient to transcend apparent differences - yielding thereby similar outcomes?

Careful analysis of the two training programs reveals the following overlap, although in different contexts, and different type materials. Each training procedure involves (1) discrimination of a particular attribute from an array of attributes; (2) scanning for repetition of the attribute or difficult ones; (3) retaining observed or inferred characteristics or relationships between instances; and (4) recognizing the complexity

of items. What distinguishes the two procedures most is in the organization of stimuli required in the classification experience, and the isolating differentiating requirements of the discrimination - memory.

The overlap between the two can probably best be presumed under the heading of attention, the focusing and attending to specific object and task requirements. The difference between the two is in what is explicitly expected as a consequence of attention. In the classification condition, the consequence to attending is explicit categorization on inferred or explicit criteria; while in the discrimination-memory training, the task is not explicitly to organize the material, but rather repeat back as if by rote.

In spite of the differences, however, the fact that a similar outcome occurred in a conservation study raises the question as to differential effect of these training programs.

A comparison was made between the two training procedures with, however, modification of the discrimination-memory training by elaborating and extending it to be in fact attention training. These training procedures were employed in a longitudinal training study. The classification training employed was similar to that described above, but the attention training included systematic exposure to discrimination of form, color, size; analysis of complex figures, labeling attributes of objects among other tasks. Differences between items were accentuated. Similarities were focused on only in regard to identical match to sample. No inferential responses were ever required.

The results of this study are complicated, but for purposes here, suffice to say that for children embarking on attention training for the first time showed little gain in classification behavior, but where conservation skills were acquired, it was from children who had been exposed to attention training.

Of particular interest is the fact that one group had a year earlier received classification training and then had received attention training. This group of children did poorer in classification training. It is as though attention training inhibits inferential and grouping behavior. But why should that be?

Attentional behavior has been of considerable interest in recent years, evidenced by the use of this construct in a variety of research settings, e.g., Zeaman-House with retardates to Kagan and Lewis (1965) with infants.

Although the attentional constructs vary to some degree, there is a basic agreement that attending by focusing on particular facets of stimuli facilitates learning - at least for discrimination learning tasks. Discrimination learning tasks, however, require attentional mechanisms. Should attentional behaviors influence other intellective or learning functions? For example, what might be the effect of training in attention on classification skills on impulse control, etc.

Perhaps an analysis of attention behavior might be of help. First, attention requires rejection of or at least disregard of the non-relevant, focusing on specific conditions, at the expense of other possible sources of distraction, in a prerequisite to attending. Spin-off behavior here may be in the affective domain - control of impulses to disengage with the

given and respond to the non-relevant, decision to persist suggests concentration on a task; this characteristic suggests further the issue of energy level to sustain the attention.

In addition to the non-substantive gains described above, there is certainly every reason to expect the child to deal with the material involved in the attentional experiences. Thus, by providing appropriate instructional material and the necessary set, the children would be acquiring specific information. More important, however, may be the fact that attentional training provides the necessary prerequisite for information processing, e.g., learning how to compare and contrast materials by employing discriminations, scanning and analysis of given materials. In contrast to classification training, where the emphasis is not placed explicitly on the focusing or discriminating behavior but on the outcomes of such behavior as reflected in classification. Thus, a key difference between classification training and attention training may well reside in differential substantive emphasis. To be specific, in classification training, the child labels various attributes. To do this, he has to select a given attribute or set of attributes from the total, label it, search for counterparts among available items in the array. Having found these, he must now articulate in some way the relationship among the items. The relationship may vary in content, e.g., it may be relationship by virtue of shared class membership, a cow and horse grouped because they each belong in the class animal or mammal; or a relationship based on independence of item, a horse and wagon are joined because the "horse pulls the wagon;" or a relationship based on commonly shared ostensive characteristics - the

horse and cow are grouped because each has four legs.

Of particular importance here is the fact that the child is expected to come up with a statement of a relationship - such a response requires employment of known labels or concepts. Classification training does involve the child bringing his own repertoire of information to bear on the problem, not only his knowledge, but his preference regarding critical attributes--cognitive style again.

By contrast, in attentional training, the child learns during the course of the task what the expected response is and it usually is a correct or incorrect one. There is the same freedom to express idiosyncratic behavior.

Each of these training procedures, on the basis of previous research in small scale short term training conditions, showed promise relevant to facilitating cognitive growth. Before advocacy of each, and before specific contributions of each can be recommended, it was necessary to test and hence to compare the impact each would have on preschool children. Thus, the study to be reported came about -- field tested in a classroom setting -- so that the contribution of each procedure could be assessed. Knowledge of the similarities and differences would be of paramount educational value, for it would allow for legitimate recommentations for each program. Thus, this study has as its primary goal the determination of the similarities and differences in cognitive outcomes as a function of classification and attentional training.

Specifically, this study has as its major purpose the comparison of two basic training procedures, classification training and attentional

training, as they affect a variety of cognitive performances in analytic classificatory and "intelligence" tasks. The rationale for selection of such classes of dependent variables is discernible from the previous discussion of the nature of classification and attention training. Classification and attention, in fact, involve within their procedure functions which should provide base-line experience for the cognitive tasks described. Thus classification emphasizing as it does labeling, verbal identification of differences and similarities, and relating items on the basis of such identifications, should influence performance on tests requiring these skills. Even though description and scanning are involved, the lack of articulation and reward for specific performance on such skills should lead to less influence on relevant dependent variables than with attention training.

In contrast, attention training emphasizes description, scanning and generalizing of latent similarities and differences. Labeling, identification of relationships, and other inferred similarities between items are not emphasized. Consequently children exposed to this type of attention training should show relatively superior performance in tasks requiring discrimination and scanning, and inferior performance on tasks requiring classification.

In both cases, the personal social traits such as interest and motivation should have no differential effect since in each case the group situation is similar. The differences between the two training programs reside in the degree to which children are encouraged to freely respond, to challenge others, and to adopt a relativistic attitude. These behaviors

are more likely to occur in the classification group, thereby influencing verbal fluency and social assertiveness. In contrast, in attention training the social controls are more specific since right and wrong answers are identified; and, therefore, the teacher is in a position to be more absolutistic. Thus, one might expect greater frequency of subdued behavior and more compliance to authority.

These later classes of variables, that is, the personal social, have not received the attention they should. Hopefully in future work the significance of these dimensions should be assessed.

CHAPTER II

METHOD

The sample of Head Start pupils for this study also served as part of a larger sample for the 1968-69 national evaulation of Head Start. While these two programs were completely separate, the design for the Michigan State University intervention study was integrated with the design for national evaluation for purposes of economy. In general, the national design dictated sample size for the intervention program yet provided this study with data that otherwise would have been too expensive to collect.

Research Design

Two types of intervention curricula based on the operations of Attention and Classification, were designed for comparative study. To delineate possible effects of the training program and to attempt to counterbalance possible positive effects of the training programs per se (Hawthorne effect) a matching, or placebo, training program was designed for both Attention and Classification curricula. Each matching program used the identical physical materials of its counterpart for every lesson, but minimized the specific treatment as much as possible. Moreover, the matching program was taught by the same teacher as the intervention program to minimize teacher effect. More will be said about this later in the section on training and control procedures. For the Attention training, the matching program focused on developing perceptual-motor skills; and for the Classification training, traditional language skills were matched. The main treatments with their respective placebos constituted two levels of each treatment due to the factors of curricular materials and pupil-pupil interaction. Ramsey (1970)

has demonstrated that instructional materials presented systematically induce cognitive strategies. The confounding factor of pupil-pupil interaction between treatment and placebo groups relative to the cognitive dimensions being studied was observed during free play periods. Thus, the experimental treatments differed from their placebo treatments only in the method of presentation of the instructional materials. Since the method was consistent with theory, the experimental groups predictably would show greater gains on appropriate cognitive dimensions, yet again it should be kept in mind that the design produced two levels of each experimental treatment rather than four independent curricular inputs. Concurrent training programs were conducted in two geographically separated locations of different sociological character to account for the location factor. In brief, the research plan can be diagrammed as follows:

Figure 1

Research Design

	Center I				Center II			
Classification training	T_1	Exp 8 / P.C. 8	T_3	Exp 8 / P.C. 8	T_6	Exp 8 / P.C. 8	T_8	Exp 8 / P.C. 8
Attention training	T_2	Exp 8 / P.C. 8	T_4	Exp 8 / P.C. 8	T_7	Exp 8 / P.C. 8	T_9	Exp 8 / P.C. 8
	T_5	Control 16			T_{10}	Control 16		

T_{1-10} - Teachers
Exp - Experimental
P.C. - Placebo Control
Number - Sample Size

Thus, there were two classrooms in each of two centers of differing geographical location which administered the Classification training and matching placebo training; and a like number administering Attention training and its placebo. In each location, one classroom was used as a pure control in which the teacher taught her regular curriculum with no input from the research program except for pre and post testing of the pupils.

Five classes were therefore involved in each center with a total of ten teachers (five/center) and one hundred sixty children. There were, in essence, five different experimental and/or control groupings within the design with thirty-two children in each category as follows:

Experimental or Control Category	Sample Size
Pure control	32
Classification training experimental	32
Classification training placebo control	32
Attention training experimental	32
Attention training placebo control	32
	160

Site, Selection

Two Head Start centers were selected to participate in the intervention program. The criteria for inclusion as a possible experimental center were:

1. Large enough number of classes to permit selection and matching.
2. Center selected would represent two different types of urban populations.
3. Directors of the programs would elect to be participants in the program.
4. Enough teachers in the program would self elect to operate the instructional phase of the program.

These conditions were admirably met in Detroit, and Pontiac, Michigan Head Start centers. Detroit provided a setting of the big city urban ghetto, while Pontiac provided a setting of middle-size urban manufacturing center. (1968 estimated Detroit population, 1,570,000; Pontiac 86,300.)

Pupil Selection

Pupils were selected in accordance with guidelines established for the national evaluation to the degree possible. One particular difficulty encountered was finding Head Start eligible children who had received no Head Start training. What with summer programs and parent interest in starting their children as young as possible in preschool training, it was possible to secure a sample in which only 60% of the subjects had no previous preschool experience. Table 1 presents a resume of the age ranges of entering pupils and the male-female constitution of the treatment groups. Table 2 shows the number of entering pupils by the type of previous Head Start experience.

As shown on both these Tables, the total N differs from the original design sample size. The final figure of 110 represents those subjects who remained after attrition and for whom complete test data was obtainable. There were several sources of attrition. First it was not possible to enroll all classes to the full 16 pupils. Detroit class size was established at 15 pupils and in Pontiac it was not possible to fill all classes -- even with intensive recruitment -- in time for inclusion in the research project. Secondly, a December flu epidemic took its toll. Thirdly, one area of Detroit was evacuated for urban renewal and subjects moved to distant locations. Finally, there was the usual out-movement of families.

TABLE 1

Intervention Sample Demographic Information

Training Group	N	Ave. Age Entering	Males	Females	Age Range Entering	
Attention	21	4-3	10	11	3-0	4-11
Perceptual-Motor	19	4-2	10	9	3-2	4-10
Classification	27	4-3	15	12	3-0	4-10
Language	17	4-4	9	8	3-7	4-10
Control	26	4-3	14	12	3-8	4-11
Total Sample	110	4-3	58	52	3-2	4-11

TABLE 2

Previous Head Start Experience of Sample Pupils

Training Group	N	Previous Head Start Experience		
		None	Summer '68 only	Full year 67-68
Attention	21	15	4	2
Perceptual-Motor	19	13	3	3
Classification	27	19	1	7
Language	17	10	3	4
Control	26	10	5	11
Total Sample	110	67	16	27

For analysis purposes, some subjects could not be included due to missing data or untestability. The procedure for excluding subjects is described in Appendix A together with subject information for each test administered.

A complete description of the sample population is provided in the analyses of the Family Interview (Appendix B). This report should provide an excellent "feel" for the sample population and the environmental conditions in which they lived.

Teacher Selection

Initial budget limitations precluded any plans for systematic teacher comparisons in the research design, although it was recognized that uncontrolled teacher differences can account for a major part of the variance in the type of design used here. The alternative was to match learning environments of the Head Start group as closely as possible in terms of teachers and facilities. The matching procedure apparently did minimize the effects of the learning environments as subsequent analysis showed no significant difference between teachers.

Selection of Teachers

The selection of five teachers in each center from the group who had indicated a willingness to participate in the study was based on the level of teacher training and experience, the availability of facilities for testing and small group training, and the recommendations of administrators. Teachers who had some previous teaching experience and held degrees were given preference. Several teachers had specific preparation in early childhood education. Space in a nearby room away from the classroom was needed

for the small group training sessions and for the individual test administrations. The Head Start directors assisted in the selection process by supplying information regarding the adequacy of space and the amount of teacher experience and preparation.

The teaching environments in the two centers were relatively equivalent. In each center, the facilities varied from one classroom to another, but the composites of classrooms in the two centers were similar. A description of each classroom located is found in Appendix C.

When the selections of classrooms and teachers had been finalized, the project coordinator in each center met with each teacher individually to prepare her for the pre-testing phase of the project and to answer any pertinent questions. Frequent individual communication with teachers was considered a key factor in maintaining a smoothly-functioning study.

Grouping the Children

Grouping scores from the Classification test were used to divide the children into equivalent groups for the training sessions. The sixteen children in each classroom were assigned to four groups by the project coordinator so that children showing a range of categorization abilities constituted both the training groups and the placebo groups. The basis of training group formulations was not disclosed to the teachers.

Instrumentation

Each child was administered a comprehensive battery of tests immediately before the intervention program and again after termination of training. The tests will be itemized below. Not all data were used in the data analysis, however, since much of the information was collected for purposes of national

evaluation and was not appropriate to the evaluation of Attention and Classification training.

The following tests were administered to all subjects: (Asterisks denote unpublished tests that are explained in Appendix D.)

1. Stanford Binet, Form L-M
2. The following subtests of the Wechsler Primary Preschool Inventory
   a. Animal House
   b. Geometric Design
   c. Block Design
   d. Picture Completion
   e. Mazes
3. Caldwell Preschool Inventory
4. Picture Sociometric*
5. Gumpgookies*
6. The following tests from the Cincinnati Autonomy Test Battery*
   a. Test of Innovative Behavior
   b. Early Childhood - Embedded Figures Test
   c. Test of Impulse Control
7. Multiple Categorization Test*
8. Merrill-Palmer Attention Test*

In addition the following ancillary data were collected:

1. Medical: Finger prick blood samples were gathered from one-half the sample (Pontiac, Mich.). These data were analyzed for Hematocrit and Hemostat for the national evaluation. However, an analysis of the Pontiac data was done as a separate study here. (Sims, Mickelson, Boger, Earhart, 1969, Appendix E).

2. Parent Interview: A comprehensive interview was conducted with parents of sample pupils by a social worker twice during the school year; before the training program and afterward.
3. Classroom Observation: Each classroom was observed four times on a periodic schedule during the school by a team of observors using the Observation of Substantive Curriculum Input (OSCI). Each observation period was two hours. After each session, the observers filled in a Post Observation Teacher Rating form (P.O.T.).

Intervention Program Schedule

Time	Event
Early October	Initial meeting with Head Start teachers and directors in the centers
Mid-October	Training of testers and parent interviewers
Late October through Mid-December	Pre-testing - National Battery and Intervention Study Battery Parent Pre-Interviews
Early January through Late March	Teacher training by project coordinator
Mid-January through Mid-April	Training sessions with Head Start children by Head Start teachers
Late March and Early April	Training of new testers Review of testing procedures for previous testers Training of parent interviewers
Mid-April through Late May	Post-testing - National Battery and Intervention Study Battery Parent Post-interviews
Late May	Individual Teacher Interview

CHAPTER III

CURRICULUM DEVELOPMENT AND PROGRAM IMPLEMENTATION

Lessons in classification training for kindergarten children were developed and used by Sigel and Olmsted in 1966-67. The next year the same children, then in first grade, were again instructed in either classification or attention training using a group of ten lessons devised by Sigel and Olmsted (1967-68). From this basis, the lessons in classification and attention training for four-year-old Head Start children were generated. Since the 1967-68 lessons were planned for six-year-old children and included several lessons dealing with abstract two dimensional designs, the first step in lesson development for the four-year-old was to carefully examine the needs and capabilities of this age level.

The Four-Year-Old Child

The four-year-old child is typically very active. He runs, jumps, hops and climbs easily. The eye-hand coordination development is evidenced by his learning to catch and throw a ball, by matching simple designs, and by his efforts to use scissors to cut on a line. His play with small groups is often a dramatic enactment of his experiences using whatever toys are at hand. He is learning about necessary limits or rules, but may go beyond the limits at times. When he tries, he often acts "silly." He enjoys experimenting with new and big words and listens attentively to stories, if the stories are not too long. The questions of "how" and "why" are frequently asked as he attempts to gain an understanding of his world.

Considerations in Lesson Development

As each lesson was generated, a number of considerations were consistently reviewed in an effort to construct sequential activities which would hold the child's interest as well as develop his cognitive abilities. The considerations are based on the developmental levels of the four-year-old as described above.

Need for Manipulation

Since the four-year-old child has a keen interest in sensory exploration, manipulative materials were considered most suitable. By handling the materials, the child's enjoyment is increased and his learning expanded through the additional sensory experience. Many of the four-year-old Head Start children are in a stage of concreteness where they are able to deal with objects much more effectively than pictures or line drawings as representations of the object. In some of the lessons, pictures of familiar objects or animals are used to assist the child in making the transition from objects to pictorial representations. This transition is difficult for these lower income children to make.

Variety of Materials

By implementing a wide variety of high-interest materials, repetitive experiences in classifying or attending can be introduced. When the same material is used in several consecutive lessons, the child's attention wanders quickly and the objectives of the lesson are difficult to accomplish. The child needs a number of opportunities to

apply and broaden his skill so that the newly acquired approaches to learning may become more firmly implanted. When materials were used in two or more consecutive lessons, the activities planned were of a "follow-up" type or introduced additional materials to use with the originals so that the lessons would not become monotonous for the children.

Change of Pace

A frequent change of pace within each lesson helps maintain the child's interest and attention. By interspersing active participation activities with more passive listening and watching activities, provisions are made for the child's need for activity and his short attention span with passive experiences.

Games

Activities which are presented as a game are enjoyable for children and, in addition, provide an opportunity to apply new knowledge. Some children are stimulated to learn a concept or skill so that their participation in a game can be more effective. The game itself, as a "fun" activity, may be one of the most efficient avenues of learning for some children. Games are incorporated in most of the lessons as an integral step in the learning process.

Vocabulary Employed

The child's understanding of the vocabulary used in the lesson presentation is directly related to his responsiveness and degree of

learning. When the labels and terms used are unfamiliar to a child, he is unable to acquire the expected knowledge. The child may use different labels which can be effectively incorporated in the presentation of a lesson. When a new term or label can be associated with, or related to, a familiar one, the child's vocabulary can be increased to include the "school" vocabulary which will be needed in his future learning experiences. In each lesson, the child's understanding of words used was given careful consideration. By first providing opportunities for relating words to previous experience and present vocabulary, a basis is provided for the next step of dealing with the ideas and learning activities involving these words.

Prerequisite Concepts

Knowledge of the prerequisite concepts is necessary before the child can follow instructions using the concepts. If a child is asked to group "round" objects and he does not have a clear concept of what "round" is, he will probably not be successful in his attempt to comply. The prerequisite concepts must be acquired before problem-solving situations using these concepts are presented. In the lesson format, the first part of the session dealt with developing the concepts needed to play the games and to accomplish the problem-solving activities which followed.

Curricula Developed

Curricula for two types of intervention training were developed so that the effects of each training, when used with four-year-old Head

Start children, could be assessed. Classification training focused on teaching the child to formulate groupings, while attention training emphasized visual discrimination learning strategies. Placebo training lessons were also developed using the same materials. The placebo training which paralleled classification training was termed language development, and the placebo training for attention training was labeled perceptual motor training.

Classification Training

The first step in learning to formulate groupings in classification training is labeling or naming an object or a picture The observable characteristics such as color, size and form, as well as attributes of function and relationship, are emphasized as each object is described. The objects within a class are compared so that similarities and differences can be enumerated. The child is then asked to formulate groups of objects according to form, color, size, relationship or function. As new categories are introduced, the child is encouraged to observe and group across the categories in a variety of ways. A guided discovery method is used in training the child to detect and recognize relationships for himself. Verbalization throughout the lesson is encouraged as an important component of the training procedure.

Attention Training

In attention training, the child first learns to observe the characteristics of objects and pictures. After one object is selected as a focal point, the child's task consists of scanning a group of

varying objects to find one or several like the example. Visual likenesses and differences are focused upon as the child makes his selection. In some lessons a model is constructed as the focus. The child's task is to construct an identical structure. A minimal amount of verbalization and labeling is incorporated in this training; instead, the child is trained to focus on visual stimuli as appropriate discriminations and identifications of likenesses and differences are made. Praise is used generously for completing a task and for attempting to perform each task. When a task is not completely correct, the teacher tries to help the child discover his mistake so he can correct his own work.

Placebo Trainings

In the placebo training, the materials used were identical to the parallel intervention training. The placebo training for classification training, labeled language development, dealt with verbalization, labeling and description, as in classification, but did not introduce sorting or grouping into categories. The placebo training, called perceptual-motor, paralleled the attention training and involved manipulation of materials to build or create according to very general instructions. The lessons for each placebo training were specified in a format identical to the intervention trainings. Each teacher was told that she was using two types of training in order to assess the effectiveness of each. The similarity of format and instructions presented in the two trainings provided evidence for the teacher that both trainings were authentic.

Lesson Format

At the beginning of each lesson, the objectives or purposes of the

session were listed along with the materials needed. The procedures to be followed were specified in a planned sequence of activities with suggested questions and other verbal input. In some lessons optional and supplemental suggestions were included. Techniques for leading a child to discover his own mistakes are incorporated in some of the first sessions. Hints which can be used to encourage appropriate responses are also delineated. A sample lesson from each type of training is included in Appendix F.

Teacher Training

In this section, the initial meetings with teachers, the selection of teachers to participate in the study, the basis of grouping the children, and the training procedures used with the teachers are described.

Initial Meetings with Teachers

The Head Start Director in each center planned a meeting with all Head Start teachers at which the Evaluation Coordinator and the two Project Coordinators discussed the intervention study. The coordinators attempted to clearly describe the research study and the expectations of the teachers who chose to participate. A few examples of the materials and procedures to be used in each type of training were demonstrated so that teachers would have valid information regarding the proposed project.

Both meetings took place in the fall. In one center, the meeting was held before Head Start classes had begun. The meeting in the second center was held shortly after the beginning of classes. In each center, the teachers asked questions to clarify their understanding after the proposed

study was described. An outline of the pertinent aspects of the project was given to each teacher. At the end of the meeting, each teacher was given an opportunity to indicate, on a checklist provided, whether or not she wished to participate in the study. An honest response was encouraged by the coordinators and no pressure to participate was exerted by the administrative personnel. All teachers in one center and more than half of the teachers in the second center indicated that they would like to be involved in the research study.

Teacher Training Procedures

Early in January, the project coordinator met with the participating teachers to set the stage for the second phase of the study, the training of children in small groups. General procedures regarding the overall organization needed to accommodate two twenty-minute training group sessions per day were discussed. Two days were required to complete each lesson and two lessons were planned for each week of the ten week training period. A total of twenty lessons were developed for each training and placebo group.

For the specific training - classification, attention or placebo - the teachers involved met with the project coordinator at the teachers' convenience. Each teacher was remunerated for the time spent in training at her regular pay rate. Usually four lessons were presented to the teachers at one training meeting. The project coordinator demonstrated the presentation of each lesson by using the written plan along with the materials provided. When interpretation or further explanation of techniques was needed, teachers readily requested this information during the

training meetings. In addition to the materials, a specially designed table was provided for each teacher to use. The table enabled each child to clearly see the materials used and the models built for the child to reproduce.

A cassette style tape recorder was provided and used during each small group session to record the proceedings of the lessons. The tapes were collected and monitored by the project coordinators to be sure that the training was being accurately presented and that placebo groups were not receiving the attention or classification training in incidental ways.

Reaction sheets were completed by the teacher after each lesson. Response was requested regarding the children's reactions to the lesson, the teacher's reaction, the appropriateness of time period required, the materials selected, and suggestions of changes, additions or deletions recommended. A sample reaction sheet is included (Appendix F).

During the first part of each of the following training meetings, the teachers discussed their experiences and reactions to the previous lessons. Some of the later lessons were revised on the basis of teachers' feedback about length of lessons and need for change of pace and variety in presentation modes. Occasionally, a teacher would question whether her children could appropriately respond to the new lessons. She was encouraged to try the lesson, but terminate the presentation when she felt the children revealed a high frustration level or lost interest. Frequently, the teachers found more favorable and capable responses than they had anticipated. One teacher who had expressed concern at the training meeting about the ability of her children to manipulate design blocks to formulate designs met the

project coordinator at the next meeting with, "Why didn't you give me more difficult designs? My children completed all of them."

Problems Encountered

The lack of adequate help to supervise the classroom while the teacher worked with four children in another room was a sincere concern of the teachers. A teacher aide and a volunteer were scheduled as helpers, but the volunteers frequently did not arrive. Some teachers felt uneasy about leaving twelve children with a teacher aide alone for two twenty-minute periods. Teachers could not wholeheartedly work with a small group when they felt that the other children were inadequately supervised. In an effort to relieve this problem, special arrangements were made for additional supervisory help in each center. Student teachers assisted the teachers in one center, while paid substitute teachers provided additional assistance in the other center.

The rooms available for training sessions presented problems for some teachers. The only suitable room in one building was located so far away from the classroom that the training session period was necessarily extended by the time required to walk to and from the room. In another building, a room near the classroom was found unsuitable as the telephone located there was inaccessible to other teachers or resulted in frequent interruptions. Other rooms in the same building were very noisy as nearby areas were used for play by other classes. One part of a large room which was sometimes used as an access route to other rooms was found most suitable. The children were seldom distracted by visitors due to the strategic techniques employed by the teacher.

The lessons as planned often required more than twenty minutes to complete. Extra games and fun activities were purposely added at the end of some lessons to provide supplemental material. Teachers were told to stop at the end of twenty minutes even though the lessons was not completed, but the teachers replied that children enjoyed the games so much that they wanted to finish the lessons. Consequently, many sessions extended beyond the twenty minute time period.

Benefits Expressed

Teachers responded with enthusiasm when the materials required for the next lessons were introduced. Some of the commercial materials were familiar to them and had been available for the children to use in their classrooms. A frequent comment was, "I had not thought of using the materials this way." Some of the teachers were stimulated to extend the use of materials currently available in their classrooms.

Each child received a share of special attention from the teacher for twenty minutes twice each week in a small group with the planned group procedure. Even though a teacher has the best of intentions and exerts a special effort to give special attention to each child regularly, some children may be missed, or may receive a minimal share of the teacher's attention, or may be unable to respond appropriately in the larger classroom group. In one class, a seemingly shy and withdrawn child had not responded verbally to the adults or entered into conversations with children for the first three months of Head Start classes. In the small group sessions, however, he immediately responded verbally with enthusiasm. The teacher was surprised and pleased with his capability. The behavior change evidenced

in the small group may have been attributable to teacher attention, a feeling of greater security, or a combination of factors. The behavior change which occurred initially during small group sessions was later exhibited in the classroom setting as well.

The tapes of the lessons were useful as a self-evaluation tool for teachers and as a means of evaluating the children's language and degree of participation. Many of the teachers regularly replayed the tapes to evaulate the lesson's progress and their own techniques. By listening for the quantity and quality of pupil participation the teacher was alerted to particular student needs which may not have been detected otherwise.

In a final interview near the end of the school year, the majority of the teachers expressed a willingness to again participate in a research study. Many teachers felt that the observed changes in student behavior provided satisfying evidence that the additional effort required as a participating teacher in the intervention study was worthwhile.

CHAPTER IV

Results

Design for Analysis

The research design incorporated three independent variables (1) treatment effects (2) teacher effects, and (3) location effects. These factors produced a design in which the variables were partially nested and partially crossed, as illustrated in the following diagram.

Figure 2

Analysis Design

Site	Pontiac, Mich.									Detroit, Mich.									
Treatment	Attn		P-M		Class		Lang		Cont	Attn		P-M		Class		Lang		Cont
Teachers	T_1	T_2	T_1	T_2	T_3	T_4	T_3	T_4	T_5	T_6	T_7	T_6	T_7	T_8	T_9	T_8	T_9	T_{10}

Training Groups: Attn = Attention, P-M = Perceptual Motor; Class = Classification; Lang = Language

The three major variables can be handled with analysis of variance; however, the treatment variable has five levels which must be assessed. Therefore, the analysis used to study these conditions was a multivariate analysis of covariance.

One of the major concerns in the design of the study was controlling the teacher variable since budget did not allow the kind of measurement that could have provided statistical control. For this reason, teaching environments were matched as closely as possible. Table 3 summarizes the multivariate analysis of covariance for the three main factors. Teacher

differences did not account for a significant portion of the variance, nor did the location of the treatments. The treatments themselves did, however, as all treatment effects across all groups were significant, ($p < .001$.)

Results

To simplify organization of the great amount of information generated by a large test battery and the multivariate analysis, results will be presented at three levels and by three general groupings of the dependent variables. The first level concerns significant findings for the total sample. In this study the control group constituted regular Head Start classrooms rather than a no treatment group. Thus all groups received some type of educational input. Secondly, there was a continuity of process common to all experimental groups versus the control group, and some results are pertinent to this condition. Finally, there were treatment effects between experimental groups which are relevant to the theoretical issues of this study.

Dependent variables can be grouped into (1) analytic tests, which include the WPPSI performance tests and the embedded figures test. In each of these tests, the solution requires a perceptual analysis of the test configuration followed by a motoric response; (2) general intelligence tests, which include the Stanford-Binet and Caldwell Preschool Inventory. These tests present the respondent a variety of tasks ranging from perceptual motor to pure verbal and; (3) classification tests. The Multiple Classification Test used in this study presents categorization tasks in two modes: actual objects, and exact size color pictures of the same objects. There are also two response styles, active and passive. In the

active style the subject forms groupings from an array by himself, while in the passive style he is asked to label a grouping presented by the examiner. Other tests were also administered to measure creativity (Response Variability) and attention span.

General Effects. As stated earlier all treatment effects across the total sample were significant. In addition there were some results of general interest that cannot be attributed to specific treatments. Of the analytic group of tests, the total Performance Score of the WPPSI was significant for all groups at the .04 level or less (Tables 6-10). Of the tests of general intelligence, the gain of the total sample on the Caldwell Pre School Inventory was significant, ($p < .01$). Concerning multiple classification, all groups gained significantly in this ability although there were significant differential effects to be discussed shortly. These general results indicate that on these important intellectual dimensions, Head Start pupils made significant gains regardless of the type of educational programs in which they participated.

Several comparisons from the correlation tables, Table 11 and 12, bear out the notion that not only did Head Start pupils gain in the dimensions noted above, but that integrative effects occurred also. The Embedded Figures Test, which is a measure of perceptual control and field independence, correlates much higher with most analytic items on the post tests versus pre tests. Likewise the WPPSI Animal House subtest, which had low to negative correlations with other WPPSI subtests on pre testing, showed significant correlations with these same subtests on post testing. To a lesser degree this was also true of the Multiple Classification subtests,

but nevertheless suggest increased integration of the function of perceptual control of complex stimuli. One very interesting comparison is that of attention span with the categorization items. Pre test correlations were zero to negative values which reversed to positive values upon post testing. This seems to indicate an organization of attention to problem solving in those situations where the problem is presented in tangible, manipulative materials. A similar relationship occurred with most of the WPPSI performance tests, but interestingly not with the general intelligence measures which are composed of more verbal items. Inter-correlations between all analytic and classification tests generally showed increased magnitudes in comparing the pre and post tests (tables 11 and 12). Thus, between tests developed from differing theoretical bases, but which required attention and perceptual control, the total group showed integration of this function.

General Experimental Effects. In regard to instructional programming, all four experimental treatment groups shared some common elements that differed from the control group, both in procedure and content. The procedural difference was that all experimental groups were structured so that teachers worked with small groups of four children away from the rest of the class, where they followed a specific instruction plan. The commonality of content was that all experimental treatments inherently contained attentional training. This is to say, that Classification and Language training by necessity include attention training, but the Attention and Perceptual-Motor programs specifically exclude classification training. The question is whether or not these groups would be superior in a test which measures attention. There was one test in the battery -- the WPPSI Picture Completion

subtest -- which is purely attentional in the sense used here. As shown in Table 5 when all four experimental groups are compared with control the difference is significant at the .05 level. Thus, attention training in a variety of formats produced specific results.

Another significant difference between experimental groups and control, shown in the same table, is the Stanford-Binet. This difference was significant at the .01 level, and perhaps is more of a reflection of procedure than anything else since the Binet is a heterogeneous rather than a single task type test. In the experimental groups teachers administered planned lessons during which they made certain each child understood the materials and responded to the instruction. This interaction, requiring instruction by the teacher and listening and responding to very specific operations by pupils, is not unlike the situation existing between tester and subject in the administration of the Binet. This, however, is not a sufficient explanation for the obtained results, and an item analysis is being conducted. What does seem important from a theoretical point of view is that specific treatments across experimental groups produced task specific gains.

Treatment Effects. The results of this study are highly complex. All that can be reported at this time are the interpretations and implications of some of the major research findings. The plan is to continue analysis of the data in order to tease out with maximum precision the cause-effect relationships and the pervasiveness of effects. Such analysis will have to be time-consuming because the multivariable content of this project poses some intriguing, fascinating questions.

As will be recalled by the reader, the design of this project involves

four training conditions with the control group embedded in the context of ongoing nursery school programs. It should be kept in mind that each training procedure as well as the placebo training procedure involved children who were also present and interacting with one another during the remaining period in a classroom setting. Thus, no matter how controlled and independent the training groups might be, there is still a constant danger of contamination between and among the children. Further, the teacher in the classification group and the attention group also taught their respective placebo conditions. The independence of these behaviors is open to some question. These difficulties could not be surmounted in the current program since one of our major efforts was to determine the feasibility of embarking on a research program embedded in a field context.

What do our results, in fact, say? First let us look at the implications of the classification training. As is indicated earlier, the classification training is a complex training program producing as its final product for the pupil a capability to organize and label a diverse array of stimuli. In the process of acquiring this skill, the child is engaged in a number of activities such as labeling, discriminating, scanning, identifying relationships and expanding his horizon of potential sources of relationship among diverse objects. The set to organize becomes, we believe, built in over the course of the training. As is indicated earlier, the children were able to improve in their capability to classify in each of the classification tests, irrespective of mode of presentation; that is, whether there was an active or passive condition or whether objects or pictures were employed. Perhaps this does not sound surprising in view of the fact that children

received training that approximated this outcome. The difference, however, resides in the difference between the training program itself and the test situation. In the training program, the child was encouraged to respond to open-ended questions with minimal structure by the teacher, whereas in the classification test situation, maximal structure in terms of item presentation and instructions to perform were given. True, in the testing situation the child had the option to select any criterial attribute of the given array that he wished as a basis for classification. Interestingly enough though, the classification training had a diffuse effect. Every subtest except for Geometric Forms showed significant change. The question that arises is, why do such diffuse effects occur? It may well be that the particular steps involved in classification training, although culminating in a labeling task, provide an opportunity for the child to acquire a range of skills which are reflected in each of the criterial tests in the post-test condition. It does raise the question of the redundancy in the post-tests however. Some interesting questions for future analysis arise, namely to identify the degree to which the same pattern of intercorrelations in the post-test condition occur for each of the training programs.

In examining the overall effects of the Language training (the placebo of classification training) we find high degrees of diffusion of post-test effects although not as pronounced as the classification training. Examination of Table 9 will demonstrate the degree to which these diffusion effects occur. Part of these findings may be explained as an effect of the classification training, since the same teacher taught both, and secondly, the same instructional materials were involved. Consequently, these are not, in

the experimental sense truely independent. The precise closure that was involved in the classification, however, did not occur in the language training; and it may be this latter effect that accounts for more significant differences occurring with classification training. However, it must not be overlooked that the possible overlap of teacher and material may, in effect, reduce the differences that would have occurred had these two programs been independently run and independently located. Data may become available through analysis of tape recordings of teaching sessions and other materials which may shed light on this question. However, at this time we are still left with the basic question of whether or not the differences may be due to the particularistic end-product of the classification and the similarities to the overlap with language training. Of particular interest is the fact that in the language training group, children did show significant changes in all classification tasks. The Mazes and Block Designs as well as the Response Variability and Attention Span did not show changes. This is not unsurprising although it was not predicted since the Mazes require a broader based scanning and anticipation behavior and the Block and Attention Span require an analysis behavior. All of these are incorporated to some degree in the classification training, in contrast to the Language training.

At this point it might be worth mentioning, and it is going to be relevant later, that results are being discussed at the .05 level of confidence. Had the more stringent .01 level of confidence been accepted, the results would look quite different in the classification post-test results. All changes in Classification behavior are at a .01 level. Whereas, in the Language training this is not the case. Thus, the probability values are different in each of these two programs. In the same connection it might be mentioned that pre-test scores are also not consistent for all groups, and

further covariance analyses are being planned to exploit the data in this regard.

Turning now to a discussion of the other treatment programs, the Attention training showed results which are also of interest. First, the effects were not as diffuse as Classification training, even though 11 of the 16 tests showed change. But in particular, not all of the classification tasks were among those. In fact, the children had difficulty in improving in their ability to perform in the picture passive condition of the Classification test. This test stands out because the task is one that involves presentation of pictures in groups which are first structured by the experimenter to which the child then is asked to respond. In effect, the child has to use the experimenter's point of view to see some relationships and do this in a modality of representation. The fact that the children had difficulty doing this suggests that they have not generalized the classification set that was created in the classification training group. Also, as has been discussed previously, they did not improve in performance in the Animal House and the Mazes. The lack of generalization or diffusion effect in the Attention condition vis-a-vis the Classification condition, speaks to the limited outcomes which occur as a function of such training. This is not unexpected as was indicated in the introduction to this report. Nevertheless, the differences are not as striking as one would have expected, in view of the fact that they did improve in a number of classification performances. In the Classification training and Language training, the children were involved in activities that allowed for language mediation and were closer perhaps to the outcome measures in the Attention training where

children were not involved in activities that were comparable to the classification performance. Changes still occurred. Thus Attention training cannot be viewed as totally independent in its effects on classification performance as compared to Classification training.

In this instance and others, the question arises as to whether or not increase in I.Q. alone may account for some of these generalized and diffuse differences. The problem here is that one doesn't know what accounts for Binet change; not what specifically did change in that heterogeneous mass of subtests which comprise the Binet. This too is a subject for further study. From the logical point of view, it is not surprising that some improvement in classification performance occurred as a function of Attention training because the scanning and discrimination activity involved in classification are also involved in attention. Thus we do find some overlap between these two training programs. The set becomes created and the rule is established that objects can be classified together and accordingly labeled which maximizes the training differences between Attention and Classification.

The placebo form for Attention training was the Perceptual-motor program, and in this condition minimal effects occurred as far as diffusion was concerned. In only 6 of the 16 tests were changes manifest; yet interestingly enough, one of those was the Binet itself. Classification was only affected in the aggregate but not in any specific classification skill. Mean scores show minimal change with the maximal change occurring in the active object condition. Thus it becomes clear that Perceptual-motor training, as described in this report, resulted in minimal change. Further

analysis of this type of training would have to be done to tease out the degree to which it is separate from Attention training. Of further interest is the fact that the Perceptual-motor group changed in fewer test scores than the control group.

Let us look for a moment at the control group and see what it has to offer us as far as some insights into the effects of the training program. This group does not show any significant change in Binet IQ; yet does change in four of the five classification tests. Interestingly enough this group also had difficulty in the passive picture categorization task similar to the attention training group. What accounts for these changes is moot at this point since this group was in what would be called a conventional Head Start educational program. The diffuse effects in this group are low, but higher than in the perceptual training groups. It may well be that in the perceptual training group the children became more focused upon specific perceptual attributes of objects without the benefit of labeling than in a more open ended regular Head Start program. Certainly, before any definitive statements can be made, more knowledge would be needed about the inputs of the conventional Head Start program.

What can be said about the over all effects of this program? If the most stringent criterion of probability level is accepted (.01) then Classification training does transfer at least to classification and some similar tasks. By accepting less stringent criteria (.05) Classification shows maximal diffusion effects of all the training programs. The need, however, as in so many researches of this type, is to pinpoint with as great precision as possible those factors which account for change. In addition to cognitive

variables, for example, examination of parental variables and other home conditions of the children also might be in order. Moreover, it must be kept in mind consistently in reviewing this report that this entire project was conducted within ongoing Head Start programs. Factors such as the enlistment of teachers' cooperation, administrator's cooperation, commitment of the teachers, availability of appropriate physical facilities and space arrangements also have to be considered.

Can one then have confidence in these results? Interestingly enough these results are consistent with a number of short term studies that have been conducted with classification training previously. In the previous studies less diffusion effects occurred than have been reported here. This may be due to the longer training period and the greater array of lessons and varieties of materials that were employed. But, there seems to be no doubt that Classification training does have an impact. How long this impact will last and how it will extend to other variables and intellectual requirements not involved in this study are yet to be shown.

The contribution of this study might be summarized as follows: (1) We are in a stronger position to identify the specific effects of Classification training as compared to other training programs. (2) The relationship between classification training and the placebo language training may suggest the significant role of language mediation as a transcendant variable which contributes to diffusion effects. Clarification of this issue can only be done by examination of the differences in teacher behavior in the classification training as compared to the language training situation. Thirdly, the role of Attention as an independent training device is brought into

question, and these results suggest it may be better to incorporate it into a classification training program including a sequence of development for training programs. Finally, the lack of significant effect of a perceptual training program beings into question the degree to which a specific minimally verbal maximally perceptual training program poses serious limitation in Head Start education.

A follow through assessment of these children may be worth considering on two issues: (1) assessment of these children as to the long-term effect of intensive training program, and (2) combining Attention and Classification training as compared to the other training programs to see if these, in combination, will heighten the effect. On the longitudinal score, one study done by Sigel and Olmsted (1970) has demonstrated that there are some long-term effects. Children who received Classification training did not lose the effects of such experiences over a follow-up period of one year.

Many questions remain in the research reported here, and certainly the directions for further research are clear. Increased precision in identifying predictors which account for changes within particular educational intervention programs are particularly important.

Code for Tables

Bin	Stanford Binet
PSI	Caldwell Preschool Inventory
EFg	Embedded Figures
AnH	Animal House*
PiC	Picture Completion*
Maz	Mazes*
Geo	Geometric Design*
Blk	Block Design*
WPS	Wechsler Performance Score*
RVa	Response Variability
AtS	Attention Span
APC	Active Pictures Categorization
PPC	Passive Pictures Categorization
AOC	Active Objects Categorization
POC	Passive Objects Categorization
MCT	Multiple Classification Total

*Wechsler Preschool and Primary Scale of Intelligence (WPPSI)

TABLE 3

Summary Table for Multivariate, Univariate
and Step Down Analysis of Covariance

		Site		Treatment		Teacher	
Multivariate	F	1.0981		2.7223		1.1850	
	df	7, 81		28, 293		70, 479	
	P Less Than	.3724		.0001		.1584	
	Variable	F	P Less Than	F	P Less Than	F	P Less Than
Univariate	MCT	1.84	.178	5.24	.001	0.55	.852
	Bin	0.15	.696	3.63	.009	1.29	.247
	AnH	3.70	.058	3.48	.011	1.74	.085
	PiC	2.29	.134	2.93	.026	0.90	.535
	Geo	0.32	.574	0.78	.542	1.26	.266
	Maz	0.27	.605	1.02	.400	1.02	.433
	Blk	0.22	.643	1.46	.223	1.59	.123
	Variable	F	P Less Than	F	P Less Than	F	P Less Than
Step Down	MCT	1.84	.178	5.24	.001	0.55	.852
	Bin	0.03	.871	3.64	.009	1.40	.192
	AnH	3.40	.069	2.61	.041	1.56	.132
	PiC	0.73	.397	3.49	.011	1.02	.433
	Geo	1.03	.313	2.05	.095	1.47	.164
	Maz	0.48	.490	1.42	.235	0.99	.461
	Blk	0.27	.604	0.61	.657	1.38	.201

TABLE 4

Post Test Means for Seven Dependent Variables*

Variable	Attention	Perceptual Motor	Classification	Language	Control
MCT	14.257	11.026	23.534	19.749	14.943
Bin	100.962	98.986	99.172	97.181	92.285
AnH	9.197	9.220	10.782	10.147	8.500
PiC	11.300	11.376	10.528	10.483	9.304
Geo	8.778	9.427	9.685	9.061	9.842
Maz	8.857	10.159	9.071	8.723	9.207
Blk	10.415	11.348	10.233	10.208	9.576

*Each adjusted for all seven pre-score covariates

TABLE 5

Univariate Scheffe' Post-Hoc Comparisons
for Treatment Group Means in Table 4**

Variable	Comparison	Confidence Interval Lower Limit	Upper Limit	Significance
Multiple Classification	$\bar{x}_3 - \bar{x}_1$	.49	18.06	.05
	$\bar{x}_3 - \bar{x}_2$	1.69	23.33	.01
	$\bar{x}_3 - \bar{x}_5$	.36	16.82	.05
	$\frac{(\bar{x}_3 + \bar{x}_4)}{2} - \frac{(\bar{x}_1 + \bar{x}_2)}{2}$	4.65	13.35	.01
Stanford Binet	$\bar{x}_1 - \bar{x}_5$	2.73	14.63	.01
	$\bar{x}_2 - \bar{x}_5$	.75	12.65	.01
	$\bar{x}_3 - \bar{x}_5$	.94	12.84	.01
	$\frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4} - \bar{x}_5$	.84	12.74	.01
WPPSI Animal House	$\bar{x}_3 - \bar{x}_5$	.01	4.55	.01
	$\frac{\bar{x}_3 + \bar{x}_4}{2} - \bar{x}_5$	.01	3.83	.025
WPPSI Picture Completion	$\frac{\bar{x}_1 + \bar{x}_2}{2} - \bar{x}_5$	.16	3.91	.025
	$\frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3 + \bar{x}_4}{4} - \bar{x}_5$	.08	3.15	.05

*$\bar{x}_1$ = mean for Attention Training group
$\bar{x}_2$ = mean for Perceptual Motor group
$\bar{x}_3$ = mean for Classification Training group
$\bar{x}_4$ = mean for Language Training group
$\bar{x}_5$ = mean for Control Training group

**Only the significant comparisons are presented here. For all variables, comparisons were calculated between all pairs of means and for all combinations of means that were considered to be of theoretical interest.

TABLE 6

Pre Test - Post Test Comparisons
Attention Training Group

Variable	Pre $\bar{X}$	S.D.	Post $\bar{X}$	S.D.	t value	Sig.
Bin	97.10	9.87	103.62	9.76	2.62	.017
PSI	30.91	9.89	39.71	8.47	4.10	.001
EFg	8.19	2.66	10.43	2.14	2.87	.009
AnH	8.95	2.22	9.62	3.01	.93	.366
PiC	9.00	2.57	11.81	2.42	3.31	.004
Maz	8.67	2.56	9.29	2.65	1.12	.277
Geo	9.14	4.52	9.05	3.23	- .13	.901
Blk	8.86	3.20	10.86	2.33	2.28	.033
WPS	92.19	11.54	100.00	11.67	3.34	.003
RVa	5.05	3.74	8.05	4.86	2.15	.044
AtS	11.31	11.66	9.55	6.75	- .79	.438
APC	3.05	4.13	4.91	4.80	2.35	.029
PPC	1.43	2.04	2.33	2.65	1.41	.174
AOC	3.48	3.93	6.05	4.18	2.79	.011
POC	1.52	1.63	4.00	2.93	2.94	.008
MCT	9.48	10.14	17.24	13.27	2.85	.010

TABLE 7

Pre Test - Post Test Comparisons
Perceptual Motor Training Group

Variable	Pre $\bar{X}$	S.D.	Post $\bar{X}$	S.D.	t value	Sig.
Bin	92.00	13.94	99.00	14.50	2.85	.010
PSI	29.32	13.31	37.53	10.13	3.03	.007
EFg	7.84	2.85	9.37	2.56	1.59	.130
AnH	8.95	2.41	9.32	2.00	.66	.515
PiC	8.89	2.83	11.58	2.71	2.74	.013
Ma-	8.53	2.89	10.21	2.90	2.32	.032
Geo	9.53	3.08	9.74	2.73	.34	.737
Blk	8.11	2.79	11.37	2.29	3.03	.007
WPS	91.95	11.86	101.95	7.40	3.30	.004
RVa	5.95	3.26	7.79	4.04	1.67	.112
AtS	8.06	5.68	9.00	5.12	.53	.605
APC	2.74	4.11	4.42	5.07	1.81	.087
PPC	1.74	3.11	2.47	2.95	.99	.336
AOC	3.74	4.47	4.89	4.81	1.84	.083
POC	1.95	2.97	2.32	2.58	.57	.576
MCT	9.68	12.49	14.11	14.65	1.96	.006

TABLE 8

Pre Test - Post Test Comparisons
Classification Training Group

Variable	Pre $\bar{X}$	S.D.	Post $\bar{X}$	S.D.	t value	Sig.
Bin	92.59	13.64	99.70	12.16	2.68	.013
PSI	30.44	10.67	40.00	8.50	4.50	.001
EFg	8.11	1.93	9.89	2.31	3.13	.004
AnH	7.82	3.09	10.82	2.99	3.13	.004
PiC	8.82	1.92	10.59	2.74	3.04	.005
Maz	8.07	3.04	9.19	3.28	2.37	.025
Geo	9.41	2.75	9.74	2.82	.61	.549
Blk	9.00	3.06	10.30	2.81	2.30	.030
WPS	90.19	13.24	100.19	15.24	3.97	.001
RVa	5.52	2.74	8.44	3.94	2.91	.007
AtS	5.46	3.98	11.56	7.79	2.95	.007
APC	1.41	1.91	7.26	3.69	4.48	.001
PPC	.59	1.12	3.63	3.20	3.81	.001
AOC	2.07	3.20	7.56	4.06	4.05	.001
POC	.82	1.50	3.70	3.01	3.58	.001
MCT	4.89	6.55	22.33	11.19	4.52	.001

TABLE 9

Pre Test - Post Test Comparisons
Language Training Group

Variable	Pre $\bar{X}$	S.D.	Post $\bar{X}$	S.D.	t value	Sig.
Bin	89.24	12.61	95.00	14.15	2.43	.027
PSI	29.00	7.85	38.35	7.36	3.37	.004
EFg	7.82	2.77	9.82	2.32	2.37	.031
AnH	6.88	1.97	9.82	1.91	3.09	.007
PiC	7.88	2.89	10.00	2.89	2.47	.025
Maz	8.00	2.67	8.65	3.66	1.20	.247
Geo	8.77	2.82	8.35	3.06	- .57	.575
Blk	8.65	2.52	10.00	3.66	1.48	.158
WPS	87.06	12.63	95.65	16.80	2.51	.023
RVa	5.65	4.20	6.53	5.19	.52	.607
AtS	5.62	3.49	11.77	15.54	1.48	.158
APC	1.12	1.76	5.41	3.86	2.98	.009
PPC	.41	1.23	1.82	1.88	2.43	.027
AOC	1.24	1.95	5.47	4.16	2.99	.009
POC	.53	1.38	2.18	1.70	2.90	.011
MCT	3.24	5.43	15.11	10.11	3.17	.006

TABLE 10

Pre Test - Post Test Comparisons
Control Training Group

Variable	Pre $\bar{X}$	S.D.	Post $\bar{X}$	S.D.	t value	Sig.
Bin	89.42	10.41	91.27	6.96	1.01	.322
PSI	27.50	9.29	36.65	9.47	4.00	.001
EFg	7.35	2.62	9.62	2.10	2.84	.009
AnH	8.23	2.72	8.27	2.31	.06	.951
PiC	8.04	2.13	9.08	2.17	2.10	.046
Maz	7.27	2.92	8.58	2.97	1.99	.058
Geo	9.96	3.66	9.88	2.75	.13	.897
Blk	8.58	2.97	9.23	2.55	1.07	.297
WPS	88.04	12.52	93.35	11.34	2.21	.037
RVa	5.50	3.72	7.81	4.24	2.21	.036
AtS	7.14	5.39	8.88	7.12	.97	.343
APC	2.08	2.68	5.31	4.80	2.53	.018
PPC	1.08	1.41	1.81	1.65	1.97	.059
AOC	2.08	2.12	5.81	4.88	3.20	.003
POC	1.12	1.68	2.81	2.87	2.74	.011
MCT	6.35	5.51	14.88	12.54	3.10	.005

TABLE 11

Correlations of Pre-Test Scores*

	Bin	PSI	EFg	AnH	PiC	Maz	Geo	Blk	WPS	RVa	AtS	APC	PPC	AOC	POC
Bin															
PSI	49														
EFg	20	39													
AnH	26	27	17												
PiC	54	50	29	13											
Maz	20	36	24	24	34										
Geo	39	35	10	-01	15	25									
Blk	42	38	17	-09	29	30	50								
WPS	56	59	29	37	57	64	69	71							
RVa	27	32	08	20	02	11	21	08	20						
AtS	08	07	15	04	09	03	09	11	09	02					
APC	22	40	12	-11	24	06	12	24	20	28	-13				
PPC	28	34	04	05	35	15	10	23	26	27	-13	56			
AOC	35	40	15	-03	35	13	14	20	26	29	-04	73	49		
POC	30	40	10	06	40	19	09	21	31	23	00	61	61	69	
MCT	35	44	14	-03	38	13	14	24	29	31	-10	89	69	92	68

*Adjusted for cell means. df=94 r=.20, p≤.05; r=.24, p≤.02; r=.27, p≤.01

TABLE 12

Correlations of Post-Test Scores*

	Bin	PSI	EFg	AnH	PiC	Maz	Geo	Blk	WPS	RVa	AtS	APC	PPC	AOC	POC
Bin															
PSI	51														
EFg	24	44													
AnH	35	29	34												
PiC	31	27	30	43											
Maz	27	35	29	21	26										
Geo	57	41	33	36	33	25									
Blk	27	41	51	32	33	50	30								
WPS	49	48	52	62	65	69	67	72							
RVa	-01	24	13	17	14	25	-04	19	19						
AtS	09	02	13	13	09	27	15	26	27	07					
APC	38	49	15	22	29	19	29	09	29	09	04				
PPC	31	46	20	26	32	22	29	15	34	10	13	71			
AOC	39	54	23	22	35	18	30	14	31	20	11	84	59		
POC	33	41	20	26	42	19	28	22	36	27	10	63	57	75	
MCT	40	52	20	25	37	24	30	13	35	18	11	92	77	92	82

*Adjusted for cell means. df=94 r=.20, p≤.05; r=.24, p≤.02; r=.27, p≤.01

CHAPTER V

IMPLICATIONS FOR EDUCATION

Perhaps the most salient result of this project was that the several experimental curricula were successfully taught in regular Head Start classrooms. In both locations, Pontiac and Detroit, the Head Start educational program had already been planned when we arrived on the scene with the experimental program. Our materials were taught partly in substitution and partly in addition to the previously planned programs. The fact that differential results were obtained which were consistent with theory speaks to the practicability of the experimental program. Yet, certainly the teachers who worked so willingly beyond the requirements of their position were ultimately responsible for the program's success. We cannot thank or praise them enough for their professional handling of the materials and their observations and comments for program improvements. The end result of this cooperative effort between teachers and research staff was a theoretically based cognitive curriculum which was teachable in regular Head Start classrooms. On the basis of this experience a revision of the curriculum was made which will be field tested during the Spring of 1970.

A Model for Introducing New Educational Programs

Most research projects produce a few serendipitous findings that are perhaps as important as answers to the research questions themselves. One such discovery in this study was an effective model for introducing curriculum change.

The introduction of most of the preschool curriculum innovations recently developed usually requires that the teacher stops what he or she

is doing and undertakes the new program. Only rarely is a teacher able to accomplish this process without some feelings of resistance, resentment or reservation, since she usually has some investment in, or preference for, the program she has devised. Thus the teacher is asked to adopt a new program, based upon the judgments of what others think will be of greater value to pupils, in place of the one that she has chosen. Change in teaching programs are usually accomplished in one of two ways. At best, teachers are presented the new program and the innovative features are explained in terms of positive benefits for pupils. Teachers are allowed to judge the program and accept or reject it accordingly. At worst, a new curriculum is adopted by educational administrators, and teachers receive the new program by decree. In both cases there usually is no mechanism designed for transition from the old method to the new.

In this program, by employing familiar instructional techniques in the placebo training groups, but paralleling these with the structured experimental training programs, teachers were allowed to operate both simultaneously. Subsequently, they could judge for themselves which curriculum was most effective. An interesting phenomenon occurred. Recall that teachers were not told which programs were experimental or placebo so as to avoid possible Hawthorne effect. Somewhat to our surprise, teachers preferred the placebo programs over the experimental in the beginning. The latter were too structured in their opinion. However, as the children began using concepts and cognitive tools gained in the experimental program during free play and other activities, teachers began changing their minds. By the end of the program most teachers favored the more structured lessons. Thus, it seems clear that teacher acceptance of new programs through

comparative usage is superior to any method that requires the teacher to completely replace an established program with a new program, regardless of the rationale favoring the new.

Unfortunately, however, the method outlined above is impractical except in a research situation, since it is undesirable to regularly split classes in half and teach two curricula. An effective resolution to the problem, that is consistent with both theory and practice, is to begin the new program with familiar teaching strategies and successively restructure content and process. The revised Classification training program mentioned earlier does this. It begins with perceptual motor manipulation of objects; proceeds to a more structured emphasis upon attending to perceptual attributes of materials, and concludes with classification training. This curriculum takes into account teacher needs together with developmental learning needs of pupils. Thus it appears that curricular innovation which successfully alters both instructional process and child learning must meet the following criteria:

1. Curricular materials must be appropriate to the target group of pupils.
2. The design for instruction must be consistent with theory.
3. Beginning lessons should be compatible with accepted teaching strategies followed by progressive transition to new strategies.

These criteria may seem self evident, however, one of the persistent criticisms of innovative curricula for Head Start is that they rarely meet all three.

The Teaching Process

A comparative study of research indicates that effective programs for educating Head Start children must include a cognitively structured curriculum

which is administered personally to each pupil by a competent teacher. Pupils, however, must also have free play time to assimilate learned material through reflective and expressive activities so that they become the possessors of the skills taught in the structured lessons. This, then, brings us to a consideration of two basic teaching strategies practiced in preschool education which are often seen as conflicting, but in reality can be, and should be, complementary.

The two strategies can be called reactive teaching and proactive teaching. In reactive teaching the child initiates a behavior either with some of the materials available in the classroom, or with another child, or both, and the teacher responds as a reinforcer by the attention she gives. "The nursery school child is influenced by his teacher's response or lack of response to what he does." (Read, 1966, p. 80). In this context the teacher can utilize behaviors initiated by the child for pointing out concepts of relation, function, number and so on. In proactive teaching the teacher designs activities to produce specific learning outcomes, and engages pupils into each activity. All cognitively structured programs fit this category. The teacher initiates the task, serves as the model for performance, and confirms each pupil's ability to accomplish every learning problem.

In their more or less pure forms each teaching strategy has certain advantages and disadvantages. Reactive teaching has the advantage that the level of activity is always appropriate to the child since the child is the initiator of the activity. The method has the disadvantage of leaving learning situations to chance. Moreover, since activity levels of children vary markedly, it is not possible for teachers to give equal

attention to the learning needs of every pupil. But a most important disadvantage of this method for Head Start children is that it relies on the coping skills brought to the school by the child; and coping skills are often deficient in children from deprived backgrounds.

On the other hand, the major disadvantage of proactive teaching is the difficulty of providing learning materials and tasks which are appropriate for the needs and abilities of various groups of children. Geographic location, ethnic background, and income status are a few of the factors which differentiate Head Start pupils. Thus it is unreasonable to believe that any single curriculum can meet the diverse needs of even the Head Start population. Thus, cognitively structured programs must be adapted to group needs. The advantages of the proactive teaching strategy are that (1) the design of the learning situation can be based on developmental and learning theories, (2) each pupil receives about equal exposure to each learning situation, and (3) pupil learning can be evaluated systematically.

The argument, however, is not that one strategy is better than the other but that they are complementary. Nevertheless, proponents of each teaching method still defend the efficacy of one over the other. At one extreme, traditionalists vigorously oppose any introduction of structured lessons in the preschool, believing this abrogates the right of the child to free exploration and creative activity. In opposition, proponents of cognitively structured curricula for Head Start children suggest that at least one and one-half hours per day of teaching cognitively structured lessons is necessary to materially improve children's cognitive abilities. We cannot agree with either position because the optimum seems to lie somewhere in between.

The experience of this project indicates that Head Start children can attend to a cognitive lesson for 15 to 20 minutes daily. They become restless and inattentive after this length of time. This fact is not surprising since they are being asked to accomodate to completely new concepts and materials. Next, they need the time and opportunity to assimilate the concepts to which they have been exposed. Assimilation is accomplished through free play, and it is at this time the teacher can respond to and reinforce the newly learned skills as they are expressed. Thus, the two teaching strategies are reciprocal. The teacher teaches the cognitive program in the early part of the school period (the accomodative phase) after which children have the usual time for free play (the assimilative phase). The teaching strategy is proactive in the former, and reactive in the latter.

This model for instruction which allows for an equilibrium to be established between accomodation to and assimilation of learning materials offers the most ideal situation for the development of intellectual functioning (Flavell, 1963, p. 65). The revision of the Classification training program which grew out of this project has been directed toward this goal.

Conclusion

Two sets of questions were posed for this research. One pertained to the theoretical issue of whether or not training in a precursory cognitive skill would induce subsequent cognitive skills according to the Piagetian stage dependent theory of cognitive development. The other pertained to the practicability of developing appropriate curricular materials and teaching

procedures that would both be consistent with theory and operable in regular Head Start classrooms.

The first question has already been discussed in some detail in the preceding chapter. However, from a broader point of view the Classification and Language training programs can be categorized as cognitively structured curricula. In this sense the results of this study are consistent with a number of other studies in which cognitively based curricula were compared with less structured "traditional" curricula (DiLorenzo, 1969; Karnes, 1968; Weikart, 1967). Generally speaking the cognitively based structured curricula produced greater gains in Head Start children -- as measured by the Stanford Binet test of intelligence -- than the less structured programs. But importantly, it was only when the cognitive curricula were taught by a teacher in a situation requiring a high degree of teacher-pupil interaction that high positive results were obtained. A Montessori program, which incorporates high structure and is cognitively based; but which does not require intensive teacher-pupil interaction, produced results similar to unstructured programs (Karnes, op. cit.).

The unique finding of this research by comparison with other cognitive programs, however, was that differential cognitive changes were demonstrated relative to curricular input. Attention training significantly increased Head Start pupils' ability to attend to the perceptual attributes of objects even when measured by a test dissimilar to the training items. Classification training likewise increased pupils' ability to categorize, both in modes similar and dissimilar to the training tasks.

Two conclusions of this study are, therefore, most important for educational considerations. First is that Attention training, while it did

apparently result in significant gains in overall classification ability when viewed by itself, nevertheless produced significantly lower gains than the Classification program. Attention training, therefore, could not be recommended as an educational program for teaching Head Start children the higher order skill of classification. Classification training, on the other hand, not only produced the greatest relative gains in classification skill, but also produced the greatest overall gain in other intellectual areas such as attention span, language skills, situation analysis and so on. Thus, the curriculum based on the higher order cognitive ability of classification produced the most conclusive results across a broad spectrum of intellectual abilities.

From the results of the total research, it can be concluded that educational programs for Head Start children together with program evaluation procedures must meet the following criteria:

1. At least fifteen minutes of each day should be spent in teaching pupils a structured educational program based upon their specific educational needs.

2. The curriculum must be developmental. The materials should be age and ability appropriate at the beginning of the program and should move sequentially toward a definite goal of cognitive competency.

3. Assessment of pupil growth should consist of task specific measures. The measurement battery should consist of tests designed to measure single intellectual dimensions. Binet type tests, which include a number of dimensions -- and are therefore difficult and often misleading to interpret -- should be avoided.

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APPENDIX A

Summary of Subjects Included For Analysis by Instrument

MISSING DATA

Because of the large test battery administered in this study in a very tight time schedule, it was impossible to obtain test data on every instrument -- both pre and post -- on every child. Therefore, decisions had to be made about exclusion of subjects for lack of data. Two decision levels were necessary. One was whether or not to completely exclude a subject from all analyses due to lacking data; the other was whether or not to exclude a subject from a specific analysis due to missing data on instruments pertaining to that dimension. This appendix describes in detail the procedures for including subjects by analysis, including generation of missing data where required.

INTERVENTION STUDY

Original sample - N = 147	
Ss dropped from achievement analysis only	N = 3
Ss dropped from categorization analysis only	N = 8
Ss dropped from both achievement and categorization analyses	N = 26
Total Ss dropped from analysis	N = 37
Ss used in both achievement and categorization analyses	N = 110

ACHIEVEMENT ANALYSIS

Tests Included: Stanford-Binet
Preschool Inventory
WPPSI:
- Animal House
- Picture Completion
- Mazes
- Block Design
- Geometric Design

Attention Span
Response Variability
Impulse Control
Embedded Figures
Multiple Classification

Procedure for Dropping Ss:

Any S is dropped from the analysis who has:

1. Missing data because untestable on any test pre or post and/or
2. Missing more than 1 post-test for any reason and/or
3. Missing all pre-data

Procedure for Estimating Data:

For missing pre-data (other than untestable Ss) the mean score for all Ss in the sample who were tested on that instrument is substituted.

For partial pre-data (other than untestable Ss) a standard score based on available data and computed from scores of all Ss in the sample tested on the relevant instruments is substituted.*

For missing post-data (other than untestable Ss) the mean score for all Ss in the same kind of training group who were tested on that instrument is substituted.

For partial post-data (other than untestable Ss) a standard score based on available data and computed from scores of all Ss in the same kind of training group who were tested on the relevant instrument is substituted.

*This applies primarily to one Response Variability score for Ss in 2 classes where pre-test was administered incorrectly.

TABLE A-1

Summary of Achievement Data for All Ss:

Pre Data	Post Data: Untestable on 1 or more tests	Missing all data (not untestable)	Missing more than 1 test (but not all)	Missing only 1 test; complete or partial data on all others	Complete or partial data on all tests
Untestable on 1 or more tests	-	4	1	1	3
Missing all data (not untestable)	-	-	-	-	-
Missing more than 1 test (but not all)	2	3	-	1	24
Missing only 1 test: complete or partial data on all others	1	-	-	1	2
Complete or partial data on all tests	-	13	1	2	88

DROP N = 29

KEEP N = 118

Total N = 147

INFORMATION CONCERNING Ss DROPPED IN ACHIEVEMENT ANALYSIS

1. Untestable pre or post - 12

   Of these 12, 9 were untestable pre and 3 were untestable post. Of the 9 who were untestable pre, 6 were missing post data and would have been dropped on that basis also. Two of those who were untestable pre had no pre-data and would have been dropped on that basis also.

2. Missing more than one post-test - 23

   19 = dropped from class
   3 = unavailable; 1 of these had also dropped from class before the completion of the post-test battery
   1 = untestable

   Also, as noted above, 6 Ss who were dropped because of being untestable on one or more instruments were also missing too much post-data to be used in the analysis. 5 of these had no post-data at all (4 because of having dropped from the class and 1 because of not being available). The other S had only a part of the post-data, having been unavailable for the rest.

   Of the 17 Ss dropped only because of missing post-data, 16 were missing all tests, while only one other S had more than one, but not all data.

3. Missing all pre-tests

   No Ss were dropped from the analysis for this reason (other than two who were untestable).

TABLE A-2

Summary of Achievement Analysis for Ss Kept in Analysis*

Pre Data	Post Data: Complete on all tests	Some partial data; nothing missing	Missing only 1 test; all other tests complete	Some partial data plus some missing data	Totals
Complete on all tests	70	1	2	-	73
Some partial data, nothing missing	17**	-	-	-	17
Some missing data; other tests complete	24	1	1	-	26
Some partial data plus some missing data	1**	-	1**	-	2
Totals	112	2	4	-	118

N = 118

TABLE A-3

Summary of Estimated Achievement Data

	Pre		Post	
	Number of tests	Number of Ss*	Number of tests	Number of Ss*
Partial data on tests	19	19	2	2
Tests missing completely	117**	28	4	4

*Column and row totals do not equal the total number of Ss for whom data was estimated, as it is possible for a single S to be counted in more than one category.

**89 if WPPSI subtests are counted as one test rather than individually.

Total number of Ss for whom estimates were made is 47, as seen from Summary Chart of Categorization Data for Ss used in the analysis.

TABLE A-4

Summary of Achievement Data for
Ss by Analysis Groups

Analysis Group	Keep			Drop
	Complete data	Estimated data	Total	
01	5	2	7	1
02	2	3	5	2
03	3	2	5	2
04	3	1	4	2
05	6	-	6	1
06	8	-	8	-
07	4	1	5	2
08	1	2	3	4
09	6	2	8	-
10	6	1	7	1
11	-	4*	4	3
12	-	6*	6	2
13	-	5*	5	2
14	-	6*	6	1
15	5	4	9	-
16	5	2	7	-
17	2	3	5	3
18	6	-	6	-
19	3	3	6	1
20	4	2	6	2
Totals	69	49	118	29

*These apply primarily to one Response Variability score in the two classes where the pre-test was administered incorrectly.

TABLE A-5

Summary of Achievement Data for Ss by Training Groups

Training Group	Keep			Drop
	Complete data	Estimated data	Total	
Classification	24	6	30	1
Attention	7	15	22	8
Language	13	6	19	9
Perceptual-Motor	6	14	20	7
Control	19	8	27	4
Totals	69	49	118	29

TABLE A-6

Summary of Achievement Data for Ss by Teachers

Teacher	Keep			Drop
	Complete data	Estimated data	Total	
Curtis (Couzens)	8	4	12	3
Johnston (Edmonson)	5	4	9	4
Ryckman (Bellevue)	10	1	11	3
Mullin (Stevenson)	9	2	11	4
Scott (Duffield)	12	3	15	1
Anthony (All Saints)	-	9*	9	5
McKinley (All Saints)	-	12*	12	3
Bellini (Mt. Olive)	7	7	14	3
Grothe (Mt. Olive)	11	2	13	-
Miles (Fairlawn)	7	5	12	3
Totals	69	49	118	29

*These apply primarily to one Response Variability score because of incorrect administration of the test in these two classes.

TABLE A-7

Summary of Achievement Data for Ss by Sites

Site	Keep		Total	Drop
	Complete data	Estimated data		
Detroit	44	14	58	15
Pontiac	25	35*	60	14
Totals	69	49	118	29

*The majority of these are for one score on the Response Variability test in two classes where the test was administered incorrectly.

CATEGORIZATION ANALYSIS

Tests Included: Active Pictures, Passive Pictures, Active Objects
Passive Objects

Procedure for Dropping Ss:

Any S was dropped from the analysis who was:

1. Missing all pre-data and/or

2. Missing any one or more subtests post

Procedure for Estimating Data:

All available pre- and post-data for the S was examined, particularly the categorization sub-tests.

Estimation of data was based on:

1. Comparison of responses by S on available pre- and post-categorization data, particularly with respect to individual patterns and styles

2. Tendencies in pre-post changes on the other tests in battery

3. Developmental theory, particularly previous work of Sigel, et al.

TABLE A-8

Summary of Categorization Data for All Ss:

Pre	Post		
	Missing all 4 sub-tests	Missing 2-3 sub-tests	Complete or partial data on all 4 sub-tests
Missing all 4 sub-tests	4	2	8
Complete or partial data on at least 1 sub-test	18	2	113

Drop N = 34

Keep N = 113

Total N = 147

INFORMATION CONCERNING Ss DROPPED IN CATEGORIZATION ANALYSIS

1. Missing all pre - 14

   9 = unavailable
   5 = untestable

   Of these 14, 6 were missing some post data (and would therefore be dropped on that basis also).

2. Missing any post - 26

   19 = dropped from class
    6 = unavailable; 1 of these had also dropped from the class before the completion of the post-test battery
    1 = untestable

   Also, as noted above, 6 Ss who were dropped because of missing pre-data were also missing post-data. 4 of these had been dropped from the class (and therefore had no post-data); one of the others was untestable and the other was unavailable for testing on at least 2 of the 4 sub-tests.

   Of the 20 Ss dropped only because of missing post-data, 18 were missing all post-data, and 2 were missing at least 2 of the 4 sub-tests.

TABLE A-9

Summary of Categorization Data for Ss Kept in Analysis*

Pre-Data	Post-Data		
	Complete on all 4 sub-tests	Some partial data; nothing missing	Total
Complete on all 4 sub-tests	38	3	41
Some partial data; nothing missing	32	16	48
Some missing data (no partial data)	7	4	11
Some partial data and some missing data	6	7	13
Total	83	30	113

N = 114

*All these Ss have at least some pre-data (any sub-tests) and also post-data (partial and/or complete) on all 4 sub-tests.

TABLE A-10

Summary of Estimated Categorization Data

	Pre		Post	
	Number of sub-tests**	Number of Ss**	Number of sub-tests**	Number of Ss*
Partial data on sub-tests	97	61	48	30
Sub-tests completely missing	40	24	-	-

*Column and row totals do not equal the total number of Ss for whom data was estimated, as it is possible (and often occurred) for a single S to be counted in more than one category.

**There are 5 sub-tests in the complete categorization test: Active Pictures, Passive Pictures, Active Objects, and Passive Objects.

Total number of Ss for whom estimates were made is 76, as seen from summary chart of categorization data for Ss used in the analysis.

TABLE A-11

Summary of Categorization Data for Ss by Analysis Groups

Analysis Group	Keep			Drop
	Complete data	Estimated data	Total	
01	2	5	7	1
02	-	5	5	2
03	3	2	5	2
04	-	4	4	2
05	2	3	5	2
06	2	6	8	-
07	1	3	4	3
08	-	2	2	5
09	3	5	8	-
10	1	6	7	1
11	2	1	3	4
12	2	5	7	1
13	2	3	5	2
14	2	4	6	1
15	4	4	8	1
16	4	2	6	1
17	3	2	5	3
18	5	1	6	-
19	-	5	5	2
20	-	7	7	1
Totals	38	75	113	34

TABLE A-12

Summary of Categorization Data for Ss by Training Groups

Training Group	Keep			Drop
	Complete data	Estimated data	Total	
Classification	12	15	27	4
Attention	6	16	22	8
Language	9	8	17	11
Perceptual-Motor	7	13	20	7
Control	4	23	27	4
Totals	38	75	113	34

TABLE A-13

Summary of Categorization Data for Ss by Teachers

Teacher	Keep			Drop
	Complete data	Estimated data	Total	
Curtis (Couzens)	5	7	12	3
Johnston (Edmonson)	-	9	9	4
Ryckman (Bellevue)	3	6	9	5
Mullin (Stevenson)	2	8	10	5
Scott (Duffield)	4	11	15	1
Anthony (All Saints)	4	4	8	6
McKinley (All Saints)	4	9	13	2
Bellini (Mt. Olive)	7	6	13	4
Grothe (Mt. Olive)	9	3	12	1
Miles (Fairlawn)	-	12	12	3
Totals	38	75	113	34

TABLE A-14

Summary of Categorization Data for Ss by Sites

Site	Keep			Drop
	Complete data	Estimated data	Total	
Detroit	14	41	55	18
Pontiac	24	34	58	16
Totals	38	75	113	34

APPENDIX B

The Family Interview

THE FAMILY INTERVIEW*

The family interviews can offer two major kinds of information--a demographic profile of the home environment of the children and attitudinal information which gives us some insight into how the mother feels about Head Start in particular, as well as about more general educational matters.

Although most parents were interviewed twice, once before Christmas and once in the late Spring, no attempt was made to look for pre-post differences. One major reason for this is that so many of the families, particularly in Detroit, have had previous Head Start experience that the "pre" data does not really represent attitudes before exposure to Head Start. This report also does not deal with the questions on the first day of school or with the discipline questions which are being separately coded and analyzed at the national level.

Profile of Head Start Families

In attempting to describe the families of the children enrolled in Head Start the most homogeneous factor is their race. In Detroit every child in the sample classes was Negro; in Pontiac 80% of the children (64 of 80) were Negro.

The age distribution shown in Table 1 is about what one would expect for mothers of pre-schoolers. Well over half the mothers are in their 20's, but there are also some under 20 as well as some (roughly 8%) over 40.

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*Prepared by Elinor B. Waters, Merrill-Palmer Institute, Detroit, Mich.

A minority of the children live in two-parent families. Table 2 shows the only 20 of the 70 Detroit respondents (28.6%) and 21 of the 57 Pontiac respondents (36.8%) are married and living with their mates. The largest group in both cities are separated.

While most of the children do not have fathers present, many of them come from large households. Table 3 shows that the number of people present in the home ranges from 2 to 16. Median household size is 5 1/2 in Detroit, 6 in Pontiac. There is also a wide range in the amount of time the children spend with a male adult. Over half of the children in both cities spend at least a half hour every day with a male adult (see Table 4). At the other extreme 10% of Detroit children and 12% of Pontiac children spend virtually no time with adult males.

With respect to educational level (Table 5), the largest category in both cities attended but did not finish high school. A higher percentage of Detroit respondents than of Pontiac respondents completed high school or went beyond it.

Table 6 shows a relatively small percent of respondents (21.6% in Detroit, 23.2% in Pontiac) were working at the time they were interviewed. The biggest difference between the cities was that 61% of the Pontiac respondents said they were looking for work, and 16.0% said they were not working and not looking. In Detroit, on the other hand, 55% said they were housewives not working and not looking,--and 21% reported they were looking for work.

The relatively small numbers of women working and/or living with their mates is reflected in the major source of income (Table 7). Welfare (specifically Aid to Dependent Children) is the primary source of income for 63%

(44 of 70) of Detroit families and 53% (30 of 57) of Pontiac respondents. Almost half of the total sample reported annual earnings between $2,000 and $4,000, which probably reflects to a large extent the level of ADC support in this area (see Table 8).

Attitudes Toward Head Start

When asked for their reactions to the Head Start program, mothers[2] were quite enthusiastic. Virtually all mothers reported that their children were eager to go to school.

Each mother was asked to identify the biggest change she had observed in her child as a result of his Head Start experience. Table 9 shows that in both Detroit and Pontiac, mothers were most impressed with new or improved skills the children had acquired. (Roughly 55% of Detroit mothers and 42% of Pontiac mothers felt this was the biggest change). They felt the children spoke more or better, had learned such things as drawing and painting, and generally expanded their interests. The second most frequently mentioned change was in the social area. About 25% of the mothers felt that the biggest change they had observed was that their children got along better with others or seemed friendlier, while 17% talked of increased maturity, independence or self-confidence.

In a closely related question, mothers were asked what they liked best about their children being in Head Start. Here again the emphasis on skills and social relations came out, as slightly over 40% answered "He has an opportunity to learn new skills," and about 35% said it gives him a chance

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[2]Since almost all respondents were mothers we shall use the word "mothers" to stand for all respondents.

to meet other children (see Table 10). Very few of the mothers (3 in Detroit and none in Pontiac) mentioned that it provides an opportunity for them to participate. This may reflect the way the question was worded rather than lack of interest in the parent part of the program.

While the mothers were enthusiastic about what their children were learning at school and pleased that the children enjoyed it, one of the Detroit interviewers detected an under current of negative reaction, in terms of the more aggressive or assertive behavior of the children. Children in pre-school are encouraged to ask questions, express opinions and engage in activities such as water play which parents may find annoying when done at home. Some reported that the children "talked back more" or "acted lippy" since they started Head Start.

The mothers were very enthusiastic about their relationships with the teachers. They felt the teachers were genuinely interested in their children and this gave mother and teacher a strong common bond. This concern of the teachers transcended racial lines. Some of the parents wanted interviewers to know that "she's such a good white teacher."

The positive feeling about the teachers did not carry over to the social workers who have primary responsibility for the parent group. Part of this is probably an "occupational hazard." Social workers, regardless of their employers, are suspect in the minds of many welfare recipients. Some of the Detroit mothers felt that the social workers had too much control over the operations of the parent group.

The last question on the Spring interview was "What, if anything, would you change about the Head Start program in your center?" The majority of

mothers in both Pontiac and Detroit indicated they would not make any changes. However, Detroit mothers tended to amplify this reaction by making positive statements as to what they liked about the program and why it should not be changed. Responses to this question are classified in Table 11.

Class 1 responses are those in which the mother simply replied "nothing" or "I don't think it is in such bad shape." Class 2 responses are those in which the mother requested no changes but added a note of enthusiasm, e.g. "I don't see how they could possibly change it. I think it's just great," or "I think that they are really beautiful in pre-school. The children are treated as human beings who can learn and do."

Class 3 responses represent mothers who wanted to extend the program and specifically asked for longer hours or more days. Detroit pre-schools meet only four days a week (Wednesday is set aside for in-service training) and a few of the mothers reacted negatively to this. One mother explained, "It would be better if they went five days then four. The children get confused about the days, cry to go on the days off."

No one in Pontiac fell into Class 4, but four mothers in Detroit seemed to feel there wasn't enough content in the program. One said, "They just aren't teaching them enough," another said, "Some days they don't do anything. They should do a little more work." On the other hand, a couple of Detroit mothers were concerned that the children were learning so much in pre-school that they would find kindergarten repetitous. One suggested that "children from pre-school should be sent into a feeder school for smarter children."

Class 5 also had no one from Pontiac in it. But several mothers from Detroit expressed dissatisfaction with the parents themselves, (e.g. "If parents of some children don't cooperate with the program or plans they

should put the children out...Some of them never go near the school, they just want to get rid of the kids.") or with the functioning of the parents group, (e.g. "Have the teacher participate in the parents group." "If they had more speakers to talk about child-raising more people would come. They only talk about raising money.")

Seven mothers (five from Detroit, two from Pontiac) expressed some concern about the staff--that there should be more of them, different types of people, or that they should be better trained. One mother said, "The teacher aides aren't qualified." Another suggested "Men aides for the little boys...(they) tend to shy away from all those ladies." While a third saw a need for more help as "The teacher has too much responsibility and duties as far as training other paraprofessionals."

The last group, "miscellaneous," covers a wide variety of suggested changes. In Pontiac most of the responses classified here dealt with the need for better bus service or with ways to hold the classes closer to home so bussing wouldn't be necessary. One mother complained that "Children are sometimes late coming home," another that the "Bus is often late picking the children up." One Pontiac mother voiced the sentiments of the Coleman Report[3] when she urged Head Start to "Get a little more different standard of people involved, some rich middle class with the lower income families."

The Detroit "miscellaneous" suggestions covered a wide range of ideas. One suggested that the school should have a "day care center for low income families with small babies that would like to work." Another urged lowering the admission age to two. A third requested eliminating morning classes as

[3]Coleman, James S., Equality of Educational Opportunity, Washington: U.S. Department of Health, Education and Welfare, 1966.

"in the winter it's too hard to get them up and the weather's too cold." Two mothers from one school suggested reducing the amount of testing that was going on in the school (referring here to E and R tests) as it interfered with the program or made the children nervous.

The interviews give the impression that the mothers view the pre-school program as giving the children a head start on kindergarten, rather than as contributing to their long-range educational or occupational plans.

Two pairs of questions provided an opportunity to compare educational aspirations and expectations and occupational aspirations and expectations. There was considerable discrepancy. A comparison of Tables 12 and 13 shows that while 82% of Detroit mothers and 84% of Pontiac mothers would like their children to go to college or beyond, only 20% of Detroit mothers and 12% of Pontiac mothers expect their children to continue their schooling beyond high school.

Similarly with respect to occupations, over half of the mothers in both cities said they would like their children to get jobs in one of the top two of the seven occupational categories, but only 30% of Detroit mothers and 18% of Pontiac mothers expect their children to obtain such jobs (see Tables 14 and 15). And some of those who reported such high expectations were unrealistic--that is they said they expected their child to hold a professional job but end his formal schooling with a high school diploma. Following Rodman's notion of the lower class value stretch,[4] it would have been interesting to explore the range of jobs and schooling which mothers would find acceptable.

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[4]Rodman, Hyman, The Lower-Class Value Stretch, Social Forces, Vol. 42, December 1963, 205-215.

In view of the press for community control of schools that is currently going on in many cities of the United States it is interesting to look at the series of questions which focus on the parental role in the Head Start program. (This information all came from the Spring or post interviews). Table 16 shows that relatively few of the mothers volunteered to help out in the classroom. Sixty-two percent of Detroit mothers and 87% of Pontiac mothers said they did not volunteer at all. And most of those who did volunteer did it less than once per month. (Further information is reported in Table 16).

For those mothers who do volunteer it is apparently a highly rewarding experience. The Detroit interviewers reported that many mothers talked with considerable pride about going to the school to assist the teacher in the classroom and/or trips. They felt they learned from this experience in addition to contributing to the school program. Some specifically mentioned getting a better understanding of what children were capable of doing and of individual differences among children.

There was a big difference between the two cities in attendance at parent meetings. In Detroit only 12% of the mothers said they had not attended any meetings during the year while 55% of Pontiac mothers said they had not been to any meetings. The actual percentage of non-attenders in Pontiac is probably considerably higher than that since many mothers who responded to other questions did not respond to this one. Forty-six percent of Detroit mothers said they had attended nine or more parent meetings during the year. No Pontiac mothers reported attending that many (see Table 17). However, it must be pointed out that the two programs operate very differently in this respect. Detroit's program is officially entitled Preschool Child and Parent

Education Project and at the time of registration parents are told that participation in the parent program is required. While this requirement is not strictly enforced it may very well deter some mothers, who know they cannot or will not participate, from registering their children. No such requirement exists in Pontiac. At the time of registration mothers are told about parent meetings but they are not presented as compulsory.

The parents did not appear to be much involved in policy making in either Detroit or Pontiac. In reply to the general question "Did you help make any decisions in your Center?" 74% of Detroit mothers (42 of 57) and 96% of Pontiac mothers (48 of 50) said no. None of the mothers in either city said they "had anything to say about who was hired in the Center." Only one (of 57) Detroit mothers and three (of 55) Pontiac mothers said they knew anything about the budget at their Center.

The Detroit interviewers said that while none of the mothers expressed a desire for a policy making role in the children's part of the program, some of them were concerned about losing control over the parent program. A few of the mothers also urged more teacher involvement in the parent program, rather than leaving it in the hands of the social worker.

General Attitudes Toward Education and Life Chances

In addition to the questions about Head Start the family interview contained a section in which mothers were asked to indicate their "opinion about most schools and teachers" by answering yes or no to a series of 23 questions. Their responses are contained in Table 18 in the order in which the questions were asked.

The general feeling which emerges from this part of the interview is a positive attitude toward the values of education, and toward teachers. For example 83% of Detroit respondents and 93% of Pontiac respondents feel that getting a good education is the best way for people to improve the way they live (Question b). And even more respondents (89% in Detroit, 96% in Pontiac) felt most students should have to stay in school until they finish high school (Question 1).

Teachers were considered good examples for children by 73% of Detroit respondents and 86% of Pontiac respondents (Question q). And only 10% of the respondents in both cities agreed that teachers are poorly trained (Question w). Teachers have apparently convinced parents that they are welcome in the school as 65 out of 70 Detroit mothers and 53 out of 56 Pontiac mothers answered yes to Question f, "Do most teachers really want parents to visit the school?" Here there is some ambiguity as parents may have had Head Start classes in mind rather than "most schools and teachers." About two-thirds of the mothers answered no to Question p, "Do teachers make children go against things they are told at home?"

Two questions on curriculum provided interesting information. A substantial majority (63% in Detroit, 70% in Pontiac) said that more time should be spent teaching children reading, writing and arithmetic (Question i). At the same time less than 10% of the parents felt that too much school time is devoted to sports and games (Question g). It is not clear what activities they would like to cut down in order to provide more time for "the three r's."

Parents do seem to feel that they can do something about the school situation. Over 60% of the parents in both cities answered yes to Question d,

"Do you think there is anything that you personally can do to improve schools?" And roughly 70% in both cities said they felt they could do something about it if they disagreed with the school principal (Question u). About half of the respondents said parents <u>are</u> to blame when children do not work hard in school (Question r). The overwhelming majority (72% in Detroit, 84% in Pontiac) said that anyone can go to college if they really want to.

Pontiac and Detroit mothers disagreed significantly on two questions--the importance of grades in school (Question m) and the need for a lot of education in order to enjoy life (Question k). The majority of Detroit respondents said there are more important things in school than getting good grades, while a majority of Pontiac respondents disagreed ($x^2 = 5.94$; $p=.02$). A majority of Pontiac mothers said that people with only a little education can enjoy life just as much as people with a lot of education, but a majority of Detroit respondents disagreed ($x^2 = 9.78$; $p = .01$).

A final series of questions in the Spring interview dealt with the way mothers perceived the world they live in and their chances of "making it" in that world. Pontiac mothers tended to view the world more negatively than Detroit mothers (see Table 19). For example, in reply to the question, "In spite of what some people say the lot of the average man is getting worse," Detroit mothers were almost evenly split between those who agreed and those who disagreed, while 72% of Pontiac mothers agreed. Omitting the undecided group for both Detroit and Pontiac, ($x^2 = 5.22$; $p = .05$.) Detroit mothers were equally divided in response to the statement, "It's hardly fair to bring children into the world with the way things look for the future," while 37 of 52 Pontiac mothers agreed ($x^2 = 4.94$; $p = .05$).

Most Pontiac mothers agreed that "nowadays a person has to live pretty much for today and let tomorrow take care of itself." Here again Detroit mothers were divided and the difference ($x^2 = 4.72$) was significant at the .05 level.

About 75% of mothers in both cities agreed that "these days a person doesn't really know who he can count on."

Detroit mo hers took a more positive view of public officials than did those in Pontiac as evidenced by their replies to the statement, "There's little use writing to public officials because often they aren't really interested in the problems of the average man." Most Detroit mothers disagreed with the statement, while most Pontiac mothers agreed ($x^2 = 5.51$; $p = .05$).

There were, however, no significant differences between respondents in the two cities in their feelings about the role of luck and chances for success (Table 20). About 80% of mothers in both cities disagreed with the statement, "Good luck is more important than hard work for success." More Detroit mothers than Pontiac mothers disagreed with the statement that, "Every time I try to get ahead something or somebody stops me," but the difference was not significant. Finally, the vast majority of mothers in both cities (88% in Detroit, 79% in Pontiac) disagreed with the statement, "People like me don't have much of a chance to be successful in life."

TABLE 1

Age of Mothers of Head Start Children

	Detroit[1]		Pontiac[1]	
	N	%	N	%
16 - 20	4	6.1	3	5.4
21 - 25	18	27.3	22	39.3
26 - 30	19	28.8	12	21.4
31 - 35	8	12.1	11	19.6
36 - 40	12	18.2	3	5.4
41 and over	5	7.6	5	8.9
	66		56	

TABLE 2

Marital Status of Respondents

	Detroit		Pontiac	
	N	%	N	%
Single, never married	7	10.0	7	12.3
Divorced	5	7.1	12	21.1
Widowed	4	5.7	3	5.3
Separated	32	45.7	13	22.8
Married--mate absent	2	2.9	1	1.8
Married--living with husband	20	28.6	21	36.8
	70		57	

[1] Four children in Detroit and one child in Pontiac did not live with their mothers. It is not clear from this information whether or not the mother is living. In any case she is not part of the household in which the child lives.

TABLE 3

Total Number of People in the House

	Detroit N	Detroit %	Pontiac N	Pontiac %
2	1	1.4	2	3.5
3	7	10.0	1	1.8
4	9	12.9	10	17.5
5	18	25.7	12	21.1
6	10	14.3	8	14.0
7	9	12.9	6	10.5
8	7	10.0	3	5.3
9	1	1.4	5	8.8
10	2	2.9	5	8.8
11	0	---	2	3.5
12	2	2.9	0	---
13	2	2.9	2	3.5
14	1	1.4	1	1.8
15	0	---	0	---
16	1	1.4	0	---
	70		57	

TABLE 4

Amount of Time Child Spends with a Grown Man

	Detroit N	Detroit %	Pontiac N	Pontiac %
None	7	10.0	7	12.3
Less than 1-2 hrs/mo	1	1.4	1	1.8
1-2 hrs/mo	1	1.4	0	---
1/2-1 hr/wk	4	5.7	9	15.8
1-2 hrs/wk	13	18.6	3	5.3
More than 1/2 hr 5 days a week	5	7.1	5	8.8
More than 1/2 hr 7 days a week	39	55.7	32	56.1
	70		57	

TABLE 5

Educational Level of Respondent

	Detroit		Pontiac	
	N	%	N	%
No school	0	---	0	---
1-3 grade	0	---	1	1.8
4-6 grade	1	1.4	3	5.3
7-8 grade	4	5.7	3	5.3
9-11 grade	33	47.1	34	59.6
H.S. graduate	30	42.9	15	26.3
Some college	2	2.9	1	1.8
College graduate	0	---	0	---
	70		57	

TABLE 6

Work Status of Respondent

	Detroit		Pontiac	
	N	%	N	%
Looking for work	14	21.5	34	60.7
Not working and not looking	36	55.4	9	16.1
No, retired or disabled	0	----	0	----
No, student	1	1.5	0	----
Yes, full time	7	10.8	7	12.5
Yes, part time	7	10.8	6	10.7
	65		56	

TABLE 7

Major Source of Income

	Detroit		Pontiac	
	N	%	N	%
Mother's earnings	6	8.6	5	8.8
Father's earnings	17	24.3	9	15.8
Mother's and Father's earnings	0	----	5	8.8
Other adult's earnings	3	4.3	1	1.8
Welfare	44	62.9	30	52.6
Earnings supplemented by welfare	0	----	4	7.0
Other source	0	----	3	5.3
	70		57	

TABLE 8

Annual Earnings

	Detroit		Pontiac	
	N	%	N	%
Under 2,000	8	11.4	2	3.5
2,000 - 3,999	29	41.4	31	54.4
4,000 - 5,999	21	30.0	13	22.8
6,000 - 7,999	5	7.1	5	8.8
8,000 - 9,999	6	8.6	5	8.8
10,000 - 14,999	1	1.4	0	---
Over 15,000	0	---	1	1.8
	70		57	

TABLE 9

Major Influence of Head Start on the Child

	Detroit		Pontiac	
	N	%	N	%
Worse	0	---	0	---
Improved social relations	17	26.6	13	22.8
Increased skill (e.g. speaking, drawing)	35	54.7	24	42.1
Maturity, independence	7	10.9	13	22.8
Improved physical development	0	---	0	---
Unknown	3	4.7	7	12.3
Other	2	3.1	0	---
	64		57	

TABLE 10

What do you like best about your child's being in Head Start?

	Detroit		Pontiac	
	N	%	N	%
Nothing	0	---	0	---
Don't know	1	1.4	4	7.1
Away from mother	4	5.7	3	5.4
He enjoys it	2	2.9	4	7.1
Chance to meet others	28	40.0	16	28.6
Learns new skills	27	38.6	25	44.6
Will grow up more	5	7.1	4	7.1
Chance for mother to participate	3	4.3	0	---
Fringe benefits--medical, social services, food	0	---	0	---
	70		56	

TABLE 11

Changes in Head Start Program Suggested by Mothers

	Detroit N=55*	%	Pontiac N=62	%
1. No changes	9	16.4	35	56.5
2. No changes with positive comment	21	38.2	17	27.4
3. Extended program	5	9.1	1	1.6
4. Enriched program	4	7.3	0	---
5. Improved parent participation	6	10.9	0	---
6. Improved staff	5	9.1	2	3.2
7. Miscellaneous	8	14.5	7	11.3
	58		62	

*Three Detroit mothers offered more than one suggestion so totals do not add up to 55.

TABLE 12

Educational Aspirations--
How far would you like your child to go in school?

	Detroit		Pontiac	
	N	%	N	%
Don't know	1	1.4	0	---
Finish grade school	0	---	0	---
Finish junior high	0	---	0	---
Vocational work in high school	0	---	0	---
Finish high school	12	17.1	9	15.8
Vocational work after high school	0	---	0	---
Go to college	20	28.6	20	35.1
Finish college	30	42.9	26	45.6
Go to graduate school	7	10.1	2	3.5
	70		57	

TABLE 13

Educational Expectations--
How far do you expect him to go?

	Detroit		Pontiac	
	N	%	N	%
Don't know	13	18.6	7	12.3
Finish grade school	0	---	0	---
Finish junior high	4	5.7	7	12.3
Vocational work in high school	0	---	0	---
Finish high school	39	55.7	36	63.2
Vocational work after high school	1	1.4	1	1.8
Go to college	6	8.6	3	5.3
Finish college	5	7.1	2	3.5
Go to graduate school	2	2.9	1	1.8
	70		57	

TABLE 14

Job Aspirations--
What kind of job would you like your child to get?

	Detroit		Pontiac	
	N	%	N	%
Don't know	16	22.9	10	17.9
Unskilled workers	0	---	0	---
Semi-skilled workers	0	---	4	7.1
Skilled workers	1	1.4	3	5.4
Owners of little businesses; clerical and sales workers and technicians	10	14.3	5	8.9
Administrative personnel of large concerns; semi-professionals	4	5.7	3	5.4
Managers and proprietors of medium-sized businesses; lesser professionals	25	35.7	15	26.8
Executives of large concerns; major professionals	14	20.0	16	28.6
	70		56	

TABLE 15

Job Expectations
What kind of job do you think your child actually will get?

	Detroit		Pontiac	
	N	%	N	%
Don't know	23	32.9	21	36.8
Unskilled workers	5	7.1	11	19.3
Semi-skilled workers	5	7.1	7	12.3
Skilled workers	7	10.0	5	8.8
Owners of little businesses; clerical and sales workers and technicians	5	7.1	0	---
Administrative personnel of large concerns; semi-professionals	4	5.7	3	5.3
Managers and proprietors of medium-sized businesses; lesser professionals	17	24.3	9	15.8
Executives of large concerns; major professionals	4	5.7	1	1.8
	70		57	

TABLE 16

Number of Times Mother Volunteered in Head Start Class

	Detroit N	Detroit %	Pontiac N	Pontiac %
Did not participate	35	62.5	53	86.9
Less than once a month	16	28.6	3	4.9
Once or twice a month	1	1.8	2	3.3
About once a week	2	3.6	2	3.3
About twice a week	2	3.6	0	---
About three times a week	0	---	0	---
About four times a week	0	---	0	---
About five times a week	0	---	1	1.6
	56		61	

TABLE 17

Number of Parent Meetings Attended

	Detroit N	Detroit %	Pontiac N	Pontiac %
None	7	12.5	23	54.8
1 or 2	5	8.9	15	35.7
3 or 4	8	14.3	3	7.1
5 or 6	5	8.9	1	2.4
7 or 8	5	8.9	0	---
9 or more	26	46.4	0	---
	56		42	

TABLE 18

Educational Attitude Survey

a. Do you think teachers usually expect children to obey them?

	Detroit		Pontiac	
	N	%	N	%
Disagree	29	41.4	24	42.1
Unsure	5	7.1	0	---
Agree	36	51.4	33	57.9

b. Is getting a good education the best way for people to improve the way they live?

	Detroit		Pontiac	
	N	%	N	%
Disagree	9	12.9	4	7.0
Unsure	3	4.3	0	---
Agree	58	82.9	53	93.0

c. Do most teachers like quiet children better than noisy children?

	Detroit		Pontiac	
	N	%	N	%
Disagree	35	50.0	22	38.6
Unsure	16	22.9	2	3.5
Agree	19	27.1	33	57.9

d. Do you think that there is anything that you personally can do to improve schools?

	Detroit		Pontiac	
	N	%	N	%
Disagree	19	27.5	12	21.1
Unsure	6	8.7	6	10.5
Agree	44	63.8	39	68.4

TABLE 18 (continued)

e. Are most classrooms overcrowded?

	Detroit		Pontiac	
	N	%	N	%
Disagree	9	12.9	9	15.8
Unsure	8	11.4	3	5.3
Agree	53	75.7	45	78.9

f. Do most teachers really want parents to visit the school?

	Detroit		Pontiac	
	N	%	N	%
Disagree	4	5.7	3	5.3
Unsure	1	1.4	1	1.8
Agree	65	92.9	53	93.0

g. Do sports and games take up too much school time?

	Detroit		Pontiac	
	N	%	N	%
Disagree	58	82.9	50	87.7
Unsure	6	8.6	2	3.5
Agree	6	8.6	5	8.5

h. Do you think most children act up so badly in school that teachers can't teach?

	Detroit		Pontiac	
	N	%	N	%
Disagree	25	35.7	36	63.2
Unsure	10	14.3	3	5.3
Agree	35	50.0	18	31.6

i. Do you think that more time shoud be spent teaching children reading, writing, and arithmetic?

	Detroit		Pontiac	
	N	%	N	%
Disagree	19	27.1	13	22.8
Unsure	7	10.0	4	7.0
Agree	44	62.9	40	70.2

TABLE 18 (continued)

j. Are there any children in your neighborhood school that you don't want your child/children to play with?

	Detroit		Pontiac	
	N	%	N	%
Disagree	47	67.1	40	70.2
Unsure	4	5.7	5	8.8
Agree	19	27.1	12	21.1

k. Do people with only a <u>little</u> education enjoy life just as much as people with a <u>lot</u> of education?

	Detroit		Pontiac	
	N	%	N	%
Disagree	25	35.7	36	63.2
Unsure	6	8.6	4	7.0
Agree	39	55.7	17	29.8

l. Should most boys and girls have to stay in school until they finish high school and get a high school diploma?

	Detroit		Pontiac	
	N	%	N	%
Disagree	8	11.4	2	3.5
Unsure	0	---	0	---
Agree	62	88.6	55	96.5

m. Are there more important things in school than getting good grades?

	Detroit		Pontiac	
	N	%	N	%
Disagree	28	40.0	35	61.4
Unsure	1	1.4	1	1.8
Agree	41	58.6	21	36.8

TABLE 18 (continued)

n. Is it OK for parents to keep their children out of school to help out at home once in a while?

	Detroit		Pontiac	
	N	%	N	%
Disagree	54	77.1	49	86.0
Unsure	1	1.4	2	3.5
Agree	15	21.4	6	10.5

o. Can teachers who are very friendly control children?

	Detroit		Pontiac	
	N	%	N	%
Disagree	14	20.0	9	15.8
Unsure	10	14.3	3	5.3
Agree	46	65.7	45	78.9

p. Do teachers make children go against things they are told at home?

	Detroit		Pontiac	
	N	%	N	%
Disagree	44	62.9	38	66.7
Unsure	16	22.9	9	15.8
Agree	10	14.3	10	17.5

q. Do you think most teachers are good examples for your children?

	Detroit		Pontiac	
	N	%	N	%
Disagree	11	15.7	5	8.8
Unsure	8	11.4	3	5.3
Agree	51	72.9	49	86.0

r. Are parents to blame when children do not work hard in school?

	Detroit		Pontiac	
	N	%	N	%
Disagree	18	25.7	26	45.6
Unsure	15	21.4	3	5.3
Agree	37	52.9	28	49.1

TABLE 18 (continued)

s. Do you think anyone can go to college if they really want to?

	Detroit		Pontiac	
	N	%	N	%
Disagree	17	24.6	7	12.3
Unsure	2	2.9	2	3.5
Agree	50	72.5	48	84.2

t. Can a man often learn more on a job than he can in school?

	Detroit		Pontiac	
	N	%	N	%
Disagree	17	24.3	38	66.7
Unsure	16	22.9	4	7.0
Agree	37	52.9	15	26.3

u. If you disagree with the school principal, can you personally do anything about it?

	Detroit		Pontiac	
	N	%	N	%
Disagree	14	20.0	12	21.1
Unsure	8	11.4	3	5.3
Agree	48	68.6	42	73.7

v. Do most children have to be made to learn?

	Detroit		Pontiac	
	N	%	N	%
Disagree	37	52.9	32	56.1
Unsure	4	5.7	2	3.5
Agree	29	41.4	23	40.4

w. Do you think most teachers are poorly trained?

	Detroit		Pontiac	
	N	%	N	%
Disagree	48	68.6	49	86.0
Unsure	15	21.4	2	3.5
Agree	7	10.0	6	10.3

TABLE 19

Parent Opinion Scale (Pre-Post)

a. In spite of what some people say the lot of the average man is getting worse.

	Detroit		Pontiac	
	N	%	N	%
Strongly Disagree	1	1.8	6	10.0
Disagree	26	45.6	10	16.7
Undecided	2	3.5	3	5.0
Agree	26	45.6	17	28.3
Strongly Agree	2	3.5	24	40.0
	57		60	

b. It's hardly fair to bring children into the world with the way things look for the future..

	Detroit		Pontiac	
	N	%	N	%
Strongly Disagree	2	3.5	3	5.6
Disagree	25	43.9	12	22.2
Undecided	3	5.3	2	3.7
Agree	24	42.1	17	31.5
Strongly Agree	3	5.3	20	37.0
	57		54	

c. Nowadays a person has to live pretty much for today and let tomorrow take care of itself.

	Detroit		Pontiac	
	N	%	N	%
Strongly Disagree	2	3.5	5	8.8
Disagree	25	43.9	12	21.1
Undecided	3	5.3	0	---
Agree	25	43.9	19	33.3
Strongly Agree	2	3.5	21	36.8
	57		57	

TABLE 19 (continued)

d. These days a person doesn't really know who he can count on.

	Detroit		Pontiac	
	N	%	N	%
Strongly Disagree	0	---	3	5.6
Disagree	12	21.1	7	13.0
Undecided	1	1.8	3	5.6
Agree	37	64.9	17	31.5
Strongly Agree	7	12.3	24	44.4
	57		54	

e. There's little use writing to public officials because often they aren't really interested in the problems of the average man.

	Detroit		Pontiac	
	N	%	N	%
Strongly Disagree	1	1.8	5	8.8
Disagree	28	49.1	13	22.8
Undecided	6	10.5	4	7.0
Agree	18	31.6	17	29.8
Strongly Agree	4	7.0	18	31.6
	57		57	

TABLE 20

Parent Opinion Scale (Post Only)

a. Good luck is more important than hard work for success.

	Detroit		Pontiac	
	N	%	N	%
Disagree	46	80.7	46	79.3
Unsure	2	3.5	4	6.9
Agree	9	15.8	8	13.8
	57		58	

b. Every time I try to get ahead something or somebody stops me.

	Detroit		Pontiac	
	N	%	N	%
Disagree	35	61.4	27	46.6
Unsure	3	5.3	4	6.9
Agree	19	33.3	27	46.6
	57		58	

c. People like me don't have much of a chance to be successful in life.

	Detroit		Pontiac	
	N	%	N	%
Disagree	50	87.7	46	79.3
Unsure	0	---	1	1.7
Agree	7	12.3	11	19.0
	57		58	

APPENDIX C

Description of Head Start Sites in Sample Centers

Description of Head Start Sites in the Evaluation Sample

Evaluation was conducted in two centers, Detroit and Pontiac, Michigan. The five schools in Detroit were Stevenson, Edmonson, Couzens, Bellevue, and Duffield. Pontiac schools were All Saints Episcopal (2 classes), Mt. Olive Baptist Church (2 classes), and Fairlawn School - Pontiac State Hospital. A brief description of each site follows:

Detroit

Stevenson pre-school meets in one very large room on the second floor of an enormous building which is a combination school and office building. (It used to be an enormous church.) The room is divided into areas for eating, quiet activities, painting, and large muscle activities. Testing was done in small offices down the hall from the classrooms. The neighborhood is better than the others in our sample; most of the houses are two-family flats.

Edmonson and Couzens meet on the second floor of an apartment building in a public housing project. Classes meet in remodeled apartments. They have large numbers of odd sized rooms (some of the walls in the apartments have been knocked out). Small rooms have been made into areas for painting, housekeeping, etc. Testing was done in two smaller rooms which were completely private. The building is part of the Jeffries housing project, a large low income city housing project with both high rise and low rise buildings.

Bellevue meets in the basement of a very old elementary school. The basic site is two connected rooms. One has a slide and a jungle gym, the

other has a table, chairs and games. They also have use of the school gym two days a week. The neighborhood has many old frame two family houses, and some small industries.

Duffield pre-school meets on the 3rd floor of a large, old elementary school. They have a large room for arts and crafts, eating and other quiet activities and a smaller but adequate room down the hall for big muscle activities. It contains large drums children crawl through and tricycles. Testing was done in either the parents room or, if that was busy, in the office, or if that was busy, in the clinic on the first floor or the teachers' rest room. Some of the homes in the neighborhood are soon to be demolished for urban renewal.

Pontiac

Two classes meet in All Saints Episcopal Church which is near the down-town section of Pontiac. The basement rooms in this lovely old church are in very good condition. A gym near the classrooms provides play space on large equipment for the children. Very adequate kitchen facilities are utilized in the preparation of meals for this center and another center located on the Pontiac State Hospital grounds. Testing space was readily available near the classrooms.

One class meets at Fairlawn School on the Pontiac State Hospital grounds in a very old former school which has been replaced by new educational facilities. Some repair has been made and other renovation is in progress. The meals are brought in from All Saints Church as the kitchen facilities are very inadequate. No outdoor play area is available and indoor play facilities on large equipment is limited due to lack of space. Testing

was done in second floor rooms which had to be cleared of debris before they could be used. A narrow, poorly lighted stairway provided the only access to these rooms which were sometimes inadequately heated.

The third center, where two sample classes are located, is situated in Mt. Olive Baptist Church. The room used by both sample classes is small and poorly maintained. Some large equipment for play is provided in a large room not far from the classroom. Halls are used as play areas for tricycles and large trucks. No outdoor play areas are available. The rooms used for testing were adjoining these halls and thus noisy at times. The testing rooms were adequate otherwise. Meals are prepared at the site in a small kitchen adjacent to the classroom.

APPENDIX D

Descriptions of Non-Standard Tests

Test of Impulse Control

This measure is a variation of a subtest of the Cincinnati Autonomy Test Battery (CATB) developed by Thomas J. Banta, of The University of Cincinnati.[1] The test offers a fast and easy measure of a child's ability to control impulsivity. The subject is asked to draw a line between two points as slowly as he can. The length of the line divided by the time taken to accomplish the task provides a ratio which represents the degree to which the child is able to consciously control motor activity.

After the E demonstrates drawing a line approximately 4" long very quickly, the S is instructed to also draw a line fast in the blank space next to E's line. (See score sheet) With crayon in hand E says, "Now I'm going to draw a line v-e-r-y s-l-o-w-l-y-----just as slowly as I can." (The examiner should learn to draw this four inch line smoothly in 20 seconds.) E then says, "Now I want you to draw a line from here to here as s-l-o-w-l-y as you can." E moves finger from the top point to the bottom point of Trial 1. E now points to the top point and says, "start here."

E times the first response, and points to the top of Trial 2 and says, "I want you to draw a line from here to here -- this time even slower than the last time." "Start here."

The time for both trials is recorded, measuring only the time that the S actually spends in drawing, i.e., while crayon is on paper. This time (in seconds) is converted to .01 minute units. The distance between the points

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[1]Banta, T. J. Tests for the evaluating of early childhood education: The Cincinnati Autonomy Test Battery (CATB). In J. Helmuth (Ed.), Cognitive studies, Vol. I. Seattle: Special Child Publications, 1968.

on the score sheet is 4 inches. It was hoped to achieve a standard basis for deriving the final ratio, by using this distance, however it was necessary, in most cases because of deviations from a straight line, to use a device called a map measure to find the exact length. The total length for both trials is divided by total recorded time which has been converted to .01 minute units, to obtain the average ratio. This final ratio, a reflection of impulse control, provided a measure for analysis.

Test of Impulse Control

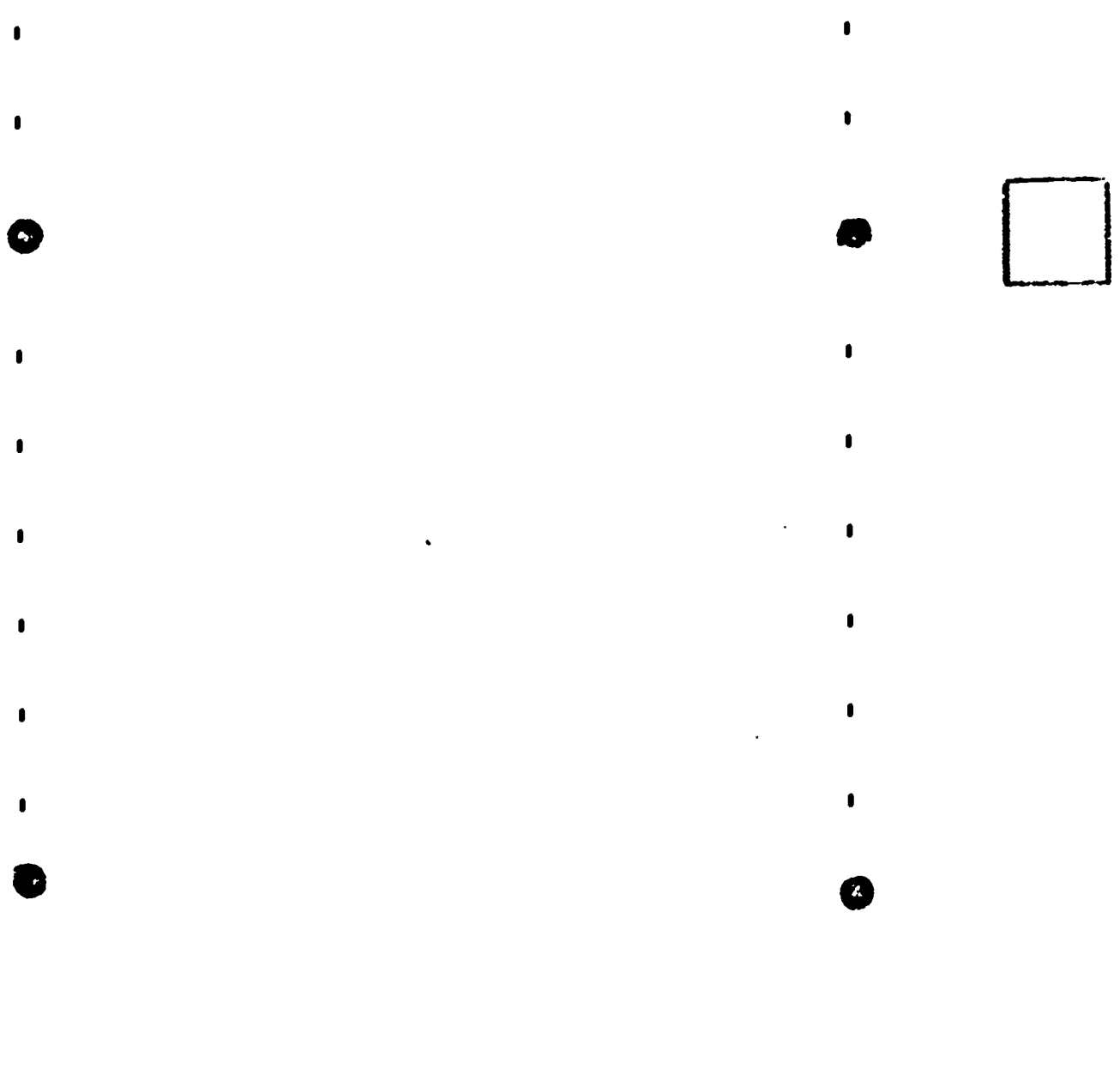
Name_____ Code_____ Date_____

School_____ Center D_____ P_____

Total Time_____ L/T_____

Trial 2

Trial 1

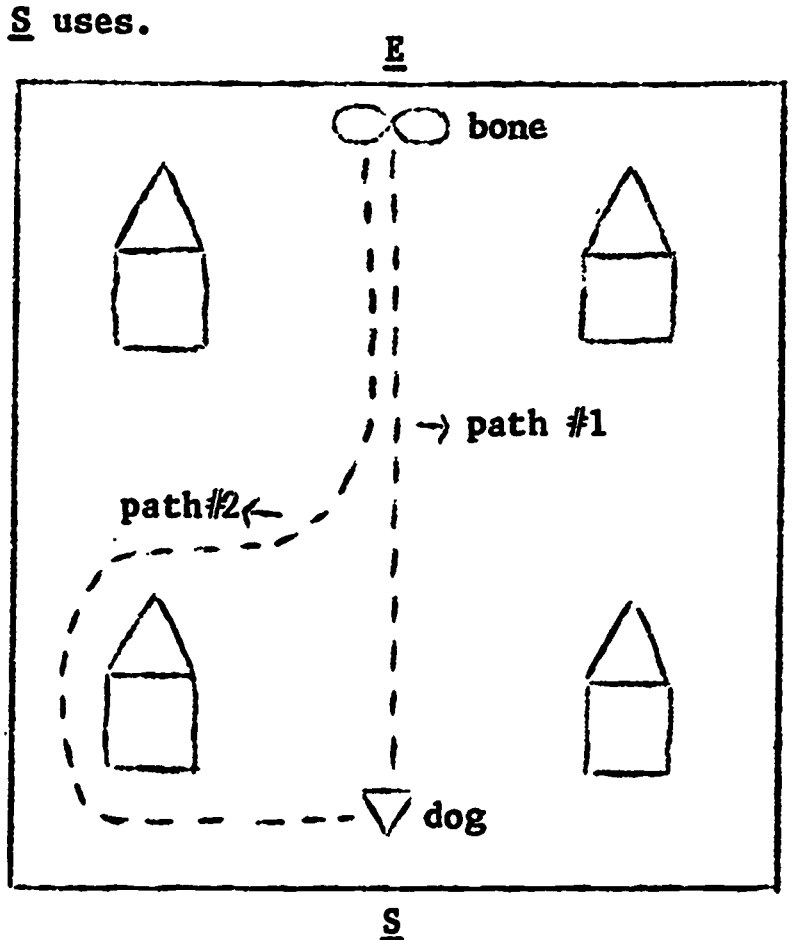


Example

Response Variability

This test is from the Cincinnati Autonomy Test Battery (CATB) and the procedures are as follows:

E points to the house saying, "These are houses." Then E picks up dog and shows it to the child saying, "What is this?" (E pauses long enough to give the child a chance to respond dog). If child does not say dog, E tells him it is a dog. E says, as she holds up the bone, "This is the doggie's bone. The doggie likes to chew his bone. One way he can get his bone is to come up this way." E demonstrates by following straight path with finger. (see figure below) E says, "And another way he can go is around this way," (as E demonstrates second path with finger). "Now you take the doggie and find another way for him to get his bone." E encourages child to pick up dog. After each response E says, "Find another way for him to get his bone." The child is encouraged to make ten responses. See scoring sheet attached. Record exact route S uses.



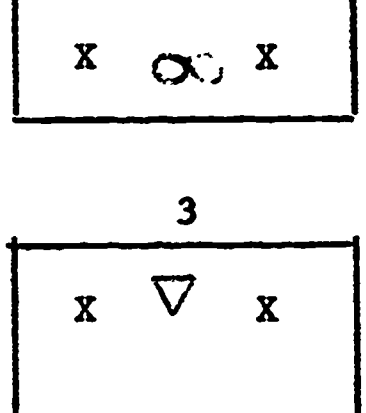
Demonstration Paths

Two scores were obtained for each child. The dog and bone total score represents the summation of the scores for each of the ten responses. Each response is allotted from 0-3 points dependent on the uniqueness and/or complexity of the child's response. The dog and bone number of ways score is the number of <u>different</u> responses the child made. These two scores were used in the analysis.

Child's Name_____ September 1966

Response Variability Score (number of different ways)_____

1



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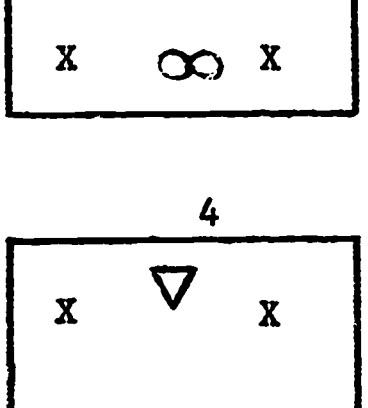

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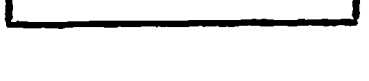

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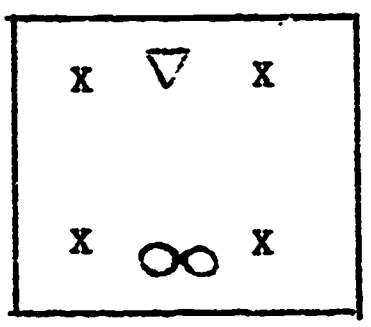

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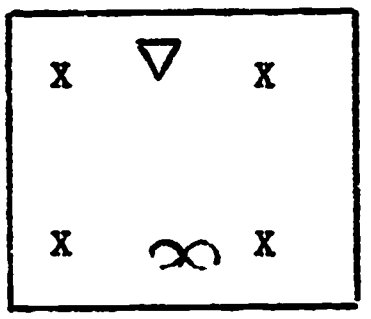

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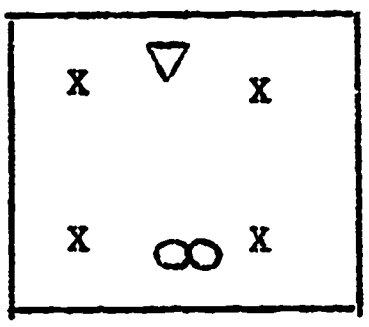

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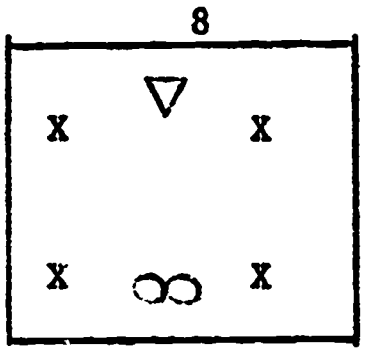

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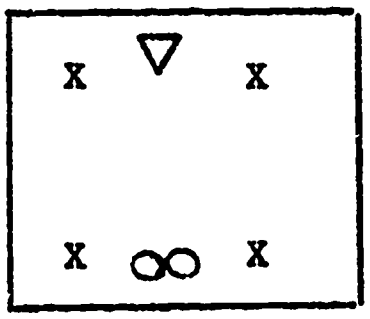

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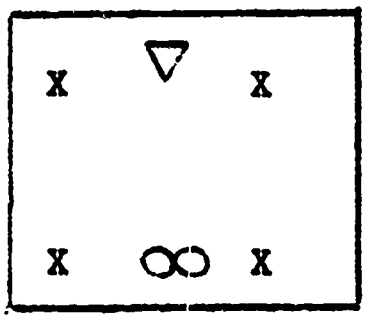


Multiple Categorization Test

This test requires children to classify three-dimensional objects and pictures of these objects. This test is reported in detail in Sigel and Olmsted, 1967, and Sigel and McBane, 1967. The twelve life-sized objects used in the object part of the test include: matchbook, blocks, notebook, cup, ball, cigarette, spoon, pencil, pipe, top, crayons, and bottle opener. For the picture part of the test, exact size colored photographs of these objects are used.

The two items, objects, or pictures, are presented in a standardized way in two tasks, Active and Passive Sorts. The child is required to select items from an array matched to a stimulus selected by the E for the Active Sort; the child is required to label a grouping constructed by the E for the Passive Sort.

Responses are scored on two levels -- verbal and type of classification. (See score sheet). The classification system refers to the mode of the child's response -- descriptive, relational-contextual, or categorical. Within the verbal level, distinctions are made among grouping, non-grouping, non-scorable, and scorable responses.

Our analyses dealt mainly with the grouping and scorable responses. Grouping responses are those in which a meaningful relationship between all of the items grouped is given. The scorable category is a much broader one, and includes not only grouping responses, but also non-grouping and global responses, i.e., any response which can be scored irrespective of the articulateness and/or rationals of the grouping. Not included are the

non-scorable responses in which an answer is not given or is not clear enough to score, or if no item(s) is selected to go with the stimulus.

The grouping and scorable responses on the twelve trials of each section of the test, Active-Picutre, Passive-Picture, Active-Object, Passive-Object, and Whole Test Totals, provided bases for analysis.

NAME_____ SUBJ. NO._____ HEAD START_____ CONDITION: OBJ._____ PICT._____

SCHOOL_____ EXAMINER_____ NON HEAD START_____ TEST: ACTIVE____ PASSIVE____

RACE: N_____ W_____ Sp_____ CODER_____ SESSION: PRE_____ POST_____

AGE: _____ DATE:_____ MALE_____ FEMALE_____

PASSIVE	ACTIVE	Trial No.	A-Verbal Level												B-Classification									
			Grouping			Non-Grouping					NS		Global Response	None	Descrip			Rel-Cont			Categor		
			Appropriate	Additional	Labeling Error	Part. & Disj.2	Disjunctive 1	Single Assoc.	Group Er.	Irrel. & Idio.	Insuf. Info.	No Choice			Form	Color	Structure	Functional	Thematic	Contextual	Low Function	High Function	Class Label
Pi. Ci. M.	123456789 10 11 12	1	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Cu. BO. S.	123456789 10 11 12	2	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
NB. Pe. Cr.	123456789 10 11 12	3	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Ba. Bl. T.	123456789 10 11 12	4	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Ba. T. M.	123456789 10 11 12	5	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Pe. Cr. Cu.	123456789 10 11 12	6	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
S. Ci. NB.	123456789 10 11 12	7	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Pe. Pi. Ci.	123456789 10 11 12	8	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Ba. T. Cu.	123456789 10 11 12	9	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
M. Cr. NB.	123456789 10 11 12	10	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Bo. T.	123456789 10 11 12	11	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
Bl. Pi. Pe.	123456789 10 11 12	12	0	1	2	3	4	5	6	7	8	9	X	0	1	2	3	4	5	6	7	8	9
		Σ																					

Early Childhood - Embedded Figures Test (ED-EFT)

This test is from CATB (op. cit.). The figure to be located in the embedded context of EC-EFT stimuli is in the shape of a cone. Three training pictures are used to assess comprehension and readiness to perform the task. During this time help is given to S until it is apparent that he comprehends what is expected of him.

There are fourteen test pictures. After each test picture is presented, the E uses these exact words, "Put our cone on top of the cone on this page." After the child places the cone, E reinforces the response by quietly saying, "Um-hm." This procedure using the exact words, is repeated for the fourteen test pictures.

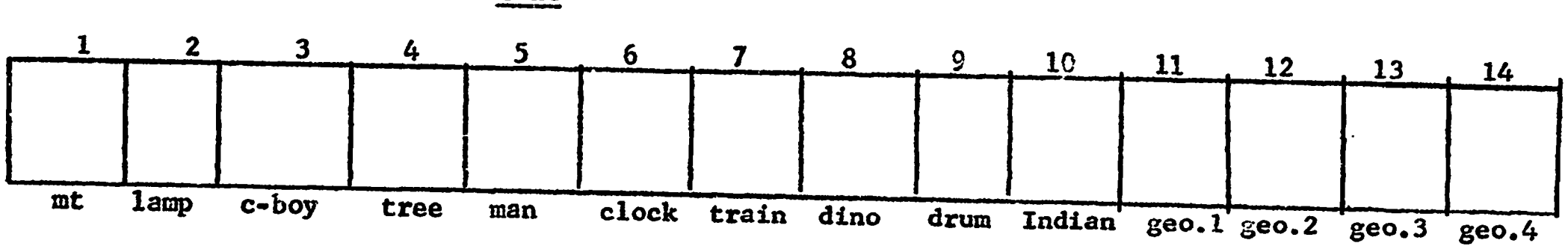
Responses to each of the 14 test pictures are scored 1 or 0. A score of 1 is given when the cut-out model is placed within ½ inch of the embedded figure. It is assumed that a ½ inch error margin allows for placement error which may result from inadequate muscle control. On the other hand, when any portion of the cut-out model is more than ½ inch away from the embedded figure, it is assumed that the S has not perceived the embedded figure and a 0 score is given. Scoring judgments can be made quickly and accurately with practice. EC-EFT total score is based on the number correct, therefore, the scores range from 0 to 14.

Child's Name_____ November, 1966

EC = EFT

Early Childhood - Embedded Figures Test

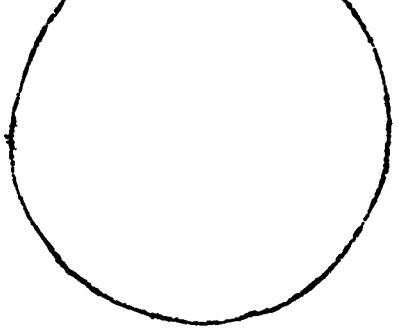
Cone

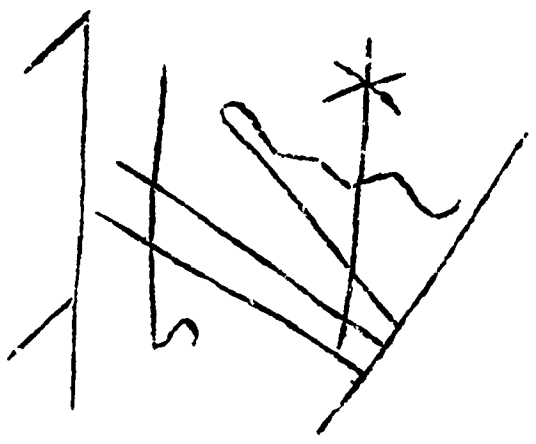


Cone Score:_____

Attention Span Test

At the beginning of the testing session E says to S, "I'm going to show you something and I want you to look at it." E holds up card #1. E then says, "Now I'm going to show you another one and I want you to look at it" and holds up card #2. At the end of the testing session, E says, "I'm going to show you one of these cards again and I want you to look at it." E holds up card #2. For each of the three trials, the time that the child focuses on the card is recorded in seconds. Timing begins with the presentation. These three scores provided the basis for analyzing attention span.





Attention Span Test

Head Start Class Location _____

Child's Name	Trial #1	Trial #2	Trial #3
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			

APPENDIX E

The Prevalence of Anemia in Head Start Children

Nutrition
Evaluation
1968-69

THE PREVALENCE OF ANEMIA IN HEAD START CHILDREN

Olaf Mickelsen
Robert Boger
Laura Sims
Eileen Earhart

Michigan State University

THE PREVALENCE OF ANEMIA IN HEAD START CHILDREN

Olaf Mickelsen, Ph.D., Laura Small Sims, M.P.H.

Department of Foods and Nutrition

Robert P. Boger, Ph.D. and Eileen Earhart, Ph.D.

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Michigan State University
East Lansing, Michigan 48823

Recent concern about the status of the disadvantaged in America has produced increasing reports of malnutrition among certain segments of the population. The social issue receiving most attention in Washington this year is the prevalence of hunger and malnutrition in the United States. Consequently, information on tne nutritional condition of the low income groups in our country has appeared in several Congressional Committee reports. Such reports are entitled, "Hunger Study" (Comm. on Agric., House of Representatives, June 11, 1968), "Hunger and Malnutrition in America" (Subcomm. on Employment, Manpower and Poverty, U.S. Senate, July 11-12, 1967), "Hunger and Malnutrition in the United States" (Ibid, May 23, 29, June 12, 14, 1968), and "Nutrition and Human Needs" (Select Comm. on Nutrition and Human Needs, U.S. Senate, Part I: Dec. 17, 18, 19, 1968; Part II: Jan. 8,9, 10, 1969; and Part III: Jan. 22, 23, 27, 28, 1969).

In 1968, a federally supported program entitled the "National Nutrition Survey" was initiated in ten states. These surveys will primarily assess the nutritional status of people in low income areas (1). One of these surveys (in Texas) has been completed and the preliminary report published (2). Other studies are currently being conducted on the premise that if nutritional deficiencies exist, the incidence will be greatest among the poor (3). Such surveys are necessary since precise data on the nutritional state of the lowest economic strata of our society are nonexistent. There are, however, a number of reports on the incidence of anemia. Current medical literature commonly describes anemia as a "significant public health problem among infants and young children" (4). In fact, some even regard this syndrome as the most common deficiency disease in infancy and childhood today (5).

Many accept the idea that nutritional anemia is particularly prevalent among "low income" or "disadvantaged" people. Klipstein states, "Anemia is more common among persons from a low socioeconomic setting and among non-whites than in the general population. . . . This is particularly true for children. . . . in whom the demand for iron is greater than normal" (6). Hillman and Smith suggest that low hemoglobin levels occur more frequently in the less favored economic groups. They attribute this to poor dietary patterns, resulting from ignorance and apathy, as well as to "marginal availability of essential nutrients" (7).

Project Head Start was initiated by Title 11-A of the Economic Opportunity Act of 1964, and was funded by the Office of Economic Opportunity as part of the Community Action Program. Designed as a means of social intervention to help children from culturally and educationally deprived families, the program contains five major components: health, nutrition, education, parent involvement, and social and psychological services (8).

During the first year of the Head Start program, mass screening of 7000 children, 3 to 6 years of age, failed to reveal the expected high incidence of anemia. The authors comment, "generalizations concerning the national incidence of nutritional anemia in preschool children on the basis of isolated local studies may not be warranted. . .however, regional studies may reveal local needs" (9).

A major objective of this paper is to present an analysis of data describing the prevalence of anemia among Head Start children in Pontiac, Michigan.

PROCEDURE:

Hemoglobin and hematocrit determinations were performed on 77 children, 4 to 6 years of age, enrolled in five classes of the Pontiac, Michigan*, Head Start Program. This sample accounts for approximately one-third of the children enrolled in the total program in that city. These five classes were participating in a curriculum intervention and evaluation project conducted by the Headstart Evaluation and Research Center at Michigan State University. Because each child met the criteria of eligibility for admission into the program he or she is assumed to be representative of the "disadvantaged" segment of the population.

One month after the program started, blood samples were collected from the 77 children enrolled; these are the "pre" data. A second series of blood samples was obtained from 52 of these children approximately six months later; they are the "post" data. Twenty-five children unaccounted for in the date either had dropped out of the program or blood samples were not collected from them for sundry reasons.

Finger prick blood samples were collected from each child for duplicate hemoglobin determinations and for duplicate microhematocrit determinations. Hemoglobin was determined by the cyanmethemoglobin procedure with a Fisher hemophotometer. On each occasion the hemoglobin procedure was standardized using a commercial standard, Hycel[1]. Microhematocrit determinations were performed using an International centrifuge. This procedure was repeated if the results were inconsistent with the hemoglobin values.

---

* According to the 1960 Census, the population of Pontiac, Michigan (25 miles north of Detroit) was 82,233. Incomes below $3000 anually were reported by 16% of the families; 45% of employed persons were engaged in manufacturing industries.

[1] Purchased from Scientific Products, Allen Park, Michigan

Approximately one hour intervened between obtaining blood samples and final analyses.

Heights and weights were obtained for each child twice during the course of the program by a registered nurse assigned to the Head Start program. Body weights were recorded to the nearest 0.25 pound using a balance beam scale. Heights, determined by using a cross bar on the scale, were recorded in 0.25 inch increments. Both measurements were taken on the same days as blood samples were collected.

THE PROBLEM OF BLOOD STANDARDS:

A major problem in translating hemoglobin levels into clinical categories is the absence of an acceptable standard for identifying anemic individuals. Many "standards" have been proposed for describing normal blood values for individuals of various age groups. However, there is so much variation in these suggested values that the incidence of anemia as judged by one standard may be very different from that based on another.

The variation in standards can be shown only by comparing a few of the more commonly used criteria. One of the most widely used standards for nutrition surveys lists the following values for 3- to 12-year old children (10):

	Deficient	Low	Acceptable	High
Hemoglobin (gm/100ml)	10.0	10.0-10.9	11.0-12.4	12.5
Hematocrit (% PCV)[1]	30.0	30.0-33.9	34.0-36.9	37.0

[1] PCV = packed cell volume.

Only a few standards specifically set levels of hemoglobin indicative of anemia. This has been done by the American Medical Association which considers anemia to exist is the 6-month to 4-year-old group when the hemoglobin level is below 11 gm/100ml of blood or when the hematocrit level is below 33% (11). The Children's Bureau Publication, "Suggested Guidelines for Evaluation of the Nutritional Status of Preschool Children," proposes that Hb values of less than 10.0 gm/100ml and/or PCV less than 30% be considered indicative of anemia (12). Another Children's Bureau publication arbitrarily defines anemia in infants and preschool children as "a state in which the concentration of hemoglobin is less than 10 gm/100ml" (13).

One of the major differences encountered in the comparison of blood standards is the connotation imparted to the terms used. Values often designated as "normal" are misleading; the reader is uninformed as to whether this level is the most commonly occurring, the mathematical average, or that which is desired or optimal. Sources listing "normal" blood values usually give higher levels than those indicative of anemia.

One of the standard textbooks of pediatrics (Holt's, 14) gives "averages for optimal conditions" as:

Age	Hemoglobin (gm/100ml)	Hematocrit (% PCV)
3-4 years	13.2 $\pm$ 0.8	40 $\pm$ 3
4-5 years	13.4 $\pm$ 1.0	40 $\pm$ 2

Another widely used pediatrics text (Nelson, 15) lists the "normal" hemoglobin value for 4-year-old children as 13.1 gm/100ml. The "high" values for children from 3 months of age to adolescence, listed in the ICNND nutrition survey manual, are considered "normal" by one pediatrician (5).

Guest, et al, propose 12.5 gm/100ml as desirable for children between three months and adolescence (16). Smith considers the normal hemoglobin level for children to be between 12.5 and 13.5 gm/100ml (17).

Because of the wide variation in accepted standards, data for this study were recorded as absolute hemoglobin and hematocrit values. Table 1 presents the levels of hemoglobin and hematocrit values observed in the Pontiac Head Start Program with studies reported in the literature.

RESULTS:

When compared to the standards commonly used in nutritional surveys (11), only one child on both occasions had a hemoglobin value in the "low" category, i.e. below 11 gm/100ml. All others had "acceptable" or "high" hemoglobin values. The latter category had as its lower limit a hemoglobin level of 12.5 gm/100ml. Over 60% of the children had levels above that value. This was true for the determinations made early in the school year as well as those toward the end of the year.

Since nearly one-third of the children in the original group were unavailable for the second set of determinations, their original hemoglobin values were examined separately. On the 15 boys and 10 girls for whom there was only the first blood value, the average hemoglobin level was 12.6 gm/100ml with a range from 11.2 to 14.0 gm/100ml. This value is comparable to that obtained for the entire group, 12.5 ± 0.6 gm/100 ml (Table 2).

The Manual for Nutritional Surveys (10) suggests that children with hemoglobin levels below 11 gm/100ml may be considered anemic. On this basis, 1.3% of the "pre" and 1.9% of the "post" determinations were indicative of anemia. However, if a hematocrit value less than 33% is used as an indi-

Table 1

Incidence of Children with Low Hemoglobin and Hematocrit Values in the Pontiac, Michigan, Head Start Program with Selected Data from the Literature. (Mean hemoglobin and hematocrit values are also listed.)

	Hemoglobin gm/100 ml			Hematocrit % PCV			
	% < 10	% < 11	Mean ± S.D.	% < 30	% < 31	% ≤ 33	Mean ± S.D.
Pontiac, Michigan "Head Start" Data:							
"Pre": n=77	0	1.3	12.5±0.6	0	0	5.3	36.75±2.0
"Post": n=52	0	1.9	12.8±0.8	0	0	7.8	37.80±2.5
Pearson, et al (9):							
Total N=7000							36.32±2.8
Chicago, n=3480					4.5		
Gainesville, n= 477					1.7		
Jacksonville, n= 622					2.8		
Augusta, n= 415					7.7		
Houston, n=1750					0.6		
Kravitz (25): n=2319	8.5	31.6					
Stine, et al (19):							
Total N= 768						Negro: 20 White: 5	35.97±3.32
All nonwhite, n= 578							35.64±3.39
All white, n= 190							36.96±2.39
All males, n= 371							35.75±3.25
All females, n= 397							36.17±3.18
White males, n=- 94							37.01±2.22
White females, n= 96							36.91±2.54
Nonwhite males, n= 277							35.32±3.43
Nonwhite females, n= 301							35.93±3.32
Kripke and VanFossen cited in Filer (4): n= 81		27.5					

Table 1 (Continued)

	Hemoglobin gm/100 ml			Hematocrit % PCV			
	% < 10	% < 11	Mean ± S.D.	% <30	% <31	% ≤33	Mean ± S.D.
Kerrey, et al (27):							
"low" income, n= 20			12.1 ± 2.9				38.9 ± 10.1
"high" income, n= 20			12.0 ± 2.8				38.8 ± 9.4
Owen, et al (3):							
Group A (lowest income)	24		10.6 ± 1.4				
Other groups	12		11.2 ± 1.2				
Haughton (31): n= 103	3.8						
Hutcheson (32): Total N=5126				4.3	11.8	25.9	
White, n=3968				4.1	9.2	23.6	
Nonwhite, n=1158				5.0	15.5	33.8	
Public Health Service Negro children under 7 years of age n= 169			11.3				
Goldsmith & Unglaub (18):							
Total N= 493	11.2	43.9	11.14 ± 1.1	1.0		5.4	37.2 ± 2.8
males n= 275			11.15 ± 1.1				37.2 ± 2.9
females n= 218			11.13 ± 1.1				37.2 ± 2.0
Unglaud (26): Total N= 499	11.2	40.8					

Table 2

Hemoglobin and Hematocrit Values for Pontiac, Michigan, Head Start Children

HEMOGLOBIN (gm/100 ml)	Deficient[1] < 10.0		Low 10.0 - 10.9		Acceptable 11.0 - 12.4		High ≥ 12.5		MEAN	RANGE
	No.	%	No.	%	No.	%	No.	%		
"Pre" Data: Boys	0	0	1[2]	2.2	16	34.8	29	63.0	12.5 ± 0.65[3]	10.1-14.0
Girls	0	0	0	0	12	38.7	19	61.3	12.5 ± 0.61	11.2-13.7
Total N= 77	0	0	1	1.3	28	36.3	48	62.4	12.5 ± 0.63	10.1-14.0
"Post" Data: Boys	0	0	1[2]	3.2	9	29.0	21	67.7[4]	12.9 ± 0.88	10.6-14.4
Girls	0	0	0	0	4	19.1	17	80.9	12.8 ± 0.68	11.0-14.1
Total N= 52	0	0	1	1.9	13	25.0	38	73.1	12.8 ± 0.78	10.6-14.4

HEMATOCRIT (PCV - %)	Deficient ≤ 30.0		Low 30.0 - 33.9		Acceptable 34.0 - 36.9		High ≥ 37.0		MEAN	RANGE
	No.	%	No.	%	No.	%	No.	%		
"Pre" Data: Boys	0	0	2	4.0	21	46.7	22	49.3	36.7 ± 2.00	33-41
Girls	0	0	2	6.7	10	33.3	18	60.0	37.0 ± 2.00	32-40
Total[5] N= 75	0	0	4	5.3	31	41.3	40	53.3	36.8 ± 2.00	32-41
"Post" Data: Boys	0	0	2	6.4	6	19.4	23	74.2	38.0 ± 2.55	32-43
Girls	0	0	2	10.0	4	20.0	14	70.0	37.6 ± 2.54	32-41
Total N= 51	0	0	4	7.8	10	19.6	37	72.5	37.8 ± 2.54	32-43

[1] Standards: ICNND, Manual for Nutrition Surveys, 1963, p. 235 (10).
[2] Same Child
[3] Standard Deviation
[4] Rounding Error
[5] Hematocrit data were unavailable for several children for whom hemoglobin data had been collected.

cation of anemia, 5.3% of the children after the first determination, and 7.8% of the children after the second could be considered as anemic. That the hematocrit determinations indicated a greater prevalence of anemia than did the hemoglobin values was also reported by McGanity, who noted that in the Texas survey of nutritional status, the "percent of low values for hematocrit was several-fold greater than those for hemoglobin" (2). In contrast, Goldsmith and Unglaub, in comparing blood data with guidelines using the hemoglobin level, mean corpuscular hemoglobin, and hematocrit, state that "use of the hematocrit as the criterion of reference gives the lowest prevalence figures" (18). They further believe "hemoglobin values are probably of the greatest significance in determining the presence of clinically defineable anemia."

This discrepancy between values for both hemoglobin and hematocrit is more apparent at the lower end of the scale. In our sample of Head Start children, the boy with the lowest Hb value (10.1 gm/100ml) had a hematocrit value of 33%, while the girl with the lowest hematocrit value (32%) had a hemoglobin level of 11.2 gm/100ml. For the higher levels, the values for hemoglobin and hematocrit correlated more closely.

The 21 girls on whom both blood determinations were made showed an increase in hemoglobin level from an average of 12.5 for the first tests to 12.8 gm/100ml for the second. The corresponding hematocrit values were 37 and 37.6% respectively. The 31 boys, from whom blood samples were secured on both occasions, showed an average change in hemoglobin level from 12.5 in the fall to 12.9 gm/100ml in the spring. Hematocrit values were 36.7 and 28.0% respectively. For those children who showed changes in hemoglobin

values between the first and second determinations (Table 3), the maximum increase was from 11.5 to 13.6 gm/100ml, which correspond to an increase in hematocrit from 34% to 40%. The maximum decrease was from 13 to 12 gm/100ml hemoglobin, which likewise corresponded to a drop in hematocrit from 39% to 35%.

Table 3

Children Showing Changes in Hemoglobin Values between the First and Second Determinations

Hemoglobin Values	Boys		Girls		Total	
	No.	%	No.	%	No.	%
Increase 0.5 gm/100ml	12	38.7	9	42.9	21	40.4
Decrease 0.5 gm/100ml	5	16.1	2	9.5	7	13.5

Racial differences in blood values were noted (Table 4). On both occasions, approximately 80% of the children tested were Negro. Although the differences noted between the values for the Negro and white children are not statistically significant, the black children had lower hemoglobin and hematocrit values than the white. Stine, et al (9) indicated a similar occurrence in their study of preschool children in the District of Columbia. Owen has noted that "it would appear that iron deficiency is at least twice as prevalent among Negro as among white children." (20)

In 1949, a study conducted in Ferndale, Michigan (a northern suburb of Detroit, approximately 15 miles southeast of Pontiac) also indicated lower hemoglobin levels for Negroes as compared with white persons in similar age groups (21). While this racial difference seems to be consistently maintained, causal factors remain unexplained

Table 4

Racial Differences in Hemoglobin Values (gm/100ml)

	Negro		White*	
	Pre	Post	Pre	Post
Male	(n=37) 12.5 0.6	(n=25) 12.8 0.9	(n=9) 12.6 0.7	(n=6) 13.2 0.5
Female	(n=25) 12.4 0.6	(n=19) 12.8 0.7	(n=6) 12.8 0.4	(n=2) 13.0 0.6

* Includes 2 Mexican-American children

To more completely assess the health status of these children, blood data were compared to height changes. Height was chosen since it is influenced to a lesser extent by many extraneous factors than is weight. Our data were compared with two standards of height for age: the Stuart-Meredith percentile standards (22) and the Iowa growth charts (23). The stuart-Meredith tables give heights for age in percentiles. The Iowa growth charts provide a mean height-age curve and indicate standard deviations therefrom. Data for both of these standards were based on measurements of white children in Iowa: however, a recent publication indicated that measurements of Negro children in the District of Columbia were similar to those figures listed in the above standards (24).

Using the Stuart-Meredith percentile standards of height for age (17), Head Start children in Pontiac were well within the acceptable ranges of "normal" (Table 5).

Table 5

Hemoglobin Values in Relation to Mean Percentile Standards of Height for Age *

		Boys		Girls	
		No.	Mean Percentile	No.	Mean Percentile
"Pre" Data:					
Hemoglobin	13 gm/100ml	9	55	6	38
	11 gm/100ml	1 **	45	-	-
"Post" Data:					
Hemoglobin	13 gm/100ml	13	57	8	47
	11 gm/100ml	1 **	50	1	89

* Data tabulated using Stuart-Meredith percentile standards of height for age (22).

** Same Child.

When the heights of these children were compared with the Iowa height-age curves (23), all were again well within the range of normal. The initial date indicated that the 9 boys with high hemoglobin levels were 0.3% above the mean for height, while the 6 girls were 0.4% less than the mean. The one boy having a low hemoglobin level was 0.7% below the mean. The follow-up data showed that the 13 boys having hemoglobin levels greater than 13 gm/100ml were 1.4% above the mean of the Iowa growth standards of height for age, while the 8 girls with similarly high hemoglobin values were 2% below the mean height for age. One boy with a hemoglobin level less than 11 gm/100ml was 0.7% below the mean, while the girl with a hemoglobin level less than 11 gm/100ml was 4.1% above the mean height for age. These data suggest that this group of Head Start children compared favorably with accepted standards of growth.

Although no significant relationship existed between the children's

status on the growth curves and the blood data, a relationship is suggested between hemoglobin levels and incremental gains in height. The 13 boys with high Hb levels on both occasions increased 0.8 inches in height in the interim. The 8 girls with Hb levels above 13 gm/100ml increased in height by approximately 0.5 inches. However, the boy and girl having "low" hemoglobin values (less than or equal to 11 gm/100ml) did not gain in height.

DISCUSSION:

Recently many investigators have pointed to the prevalence of anemia especially among low income groups, as one index of the possible poor nutritional status of the general population. Since children reportedly have a high incidence of anemia, their condition has received the most attention. Studies have suggested a "generally high" incidence of anemia among Head Start children (20). In 1965, 8.1% of the children in the Chicago Head Start program were reported to have hemoglobin values below 10 gm/100ml, and more than 30% had hemoglobin levels below 11 gm/100ml (25). Pearson, et al, reported that the average hematocrit level for nearly 7000 Head Start children in Chicago, Gainesville, Houston, Augusts, and Jacksonville was 36.3%. These authors indicated that 1 to 8% of children four to six years of age were anemic on the basis of a hematocrit value below 31% (9).

The preliminary data from the Texas nutrition survey listed the mean hemoglobin level of children 5 years old as 15 gm/100ml for boys, and 13 gm/100ml for girls (2). Less than 4% of the 5-year-old group had levels below 10 gm/100ml.

Regional differences are apparent in the prevalence of anemia. Pearson, et al, indicated that the incidence of significant anemia showed considerable

variation from city to city (9). They found that children in Chicago and Augusta had an increased frequency of anemia, when compared with figures from Gainesville, Houston, and Jacksonville. In the New Orleans Head Start program in 1968, Goldsmith and Unglaub reported that 11.2% of the children had hemoglobin levels less than 10 gm/100ml (18). In 1969, Unglaub again reported that 11.2% of the children had hemoglobin values less than 10 gm/100ml, while 40.8% had levels less than 11 gm/100ml (26). These figures contrast with the relatively low numbers with similar hemoglobin values found in the Pontiac, Michigan Head Start program. Various factors, such as the iron content of the soil, methods of food preparation, or local dietary practices, might account for this noted geographic variability.

Hemoglobin values are commonly correlated with income data. In mississippi, Owen, et al, found that 24% of preschool children from the lowest socioeconomic group (annual per capita income less than $500) had hemoglobin values less than 10 gm/100ml, compared with a total of 12% of children from the higher income groups (3). The mean hemoglobin level for the lowest income group was 10.6 gm/100ml, and for the higher income groups 11.2 gm/100ml, a difference considered to be significant. Kerry et al (Table 1), in contrast to the previous studies, found no differences in hemoglobin levels between preschool children from low-income families when compared with children from higher income families (27).

The incidence of iron-deficiency anemia is reported to reach a peak in infants 12 to 17 months of age and decrease threrafter until the condition is overcome between 3 and 6 years of age (28). Owen stated that "the same trend of decreasing incidence of anemia with increasing age was noted in low income Mississippi children" (3). "By the age of 3½ years, anemia is

relatively rare, which suggests that because of the slow rate of growth in the preschool period, the child is able gradually to accumulate enough iron to meet his needs" (29).

In revising data for approximately 22,000 children between birth and 20 years of age registered in the Children and Youth Projects, values less than 10.0 gm/100ml were relatively frequent in children less than 3 years of age but much less frequent in older children (3). The percentage of children with hemoglobin levels below 10 gm/100ml were: 13.6% for infants to 6 months of age, 22.1% for infants 6 months to 1 year, 28.5% for children 1 to 2 years and 9.2% for children 2 to 3 years of age. Since hemoglobin levels seem to improve with age, it is possible that some of the Pontiac Head Start children may have had low hemoglobin levels at an earlier age.

The data presented from the Pontiac Head Start study are quite comparable to those from other studies throughout the country (Table 1). Whether one chooses to interpret the findings as suggestive of the extensive prevalence of anemia in these children will depend on the standard chosen. On the basis of hemoglobin and height, most of the Head Start children examined in Pontiac, Michigan appeared to be normal.

SUMMARY:

Hemoglobin and hematocrit values and the height meaaurements are presented for 77 children enrolled in the Pontiac, Michigan Head Start program. On the basis of these findings, the mean hemoglobin level of all subjects for blood collected in the fall shortly after the program started was 12.5 gm/100ml, while the mean value for blood collected in the following spring was 12.8 gm/100ml. Comparable hematocrit values were 36.8% and

37.8%, respectively. Over 60% of the children in this study were in the "high" range of values for both parameters according to standards commonly used in nutritional surveys (10). Comparisons of the blood data with nationally accepted growth standards of height for age revealed that these children were well within acceptable ranges of "normal".

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APPENDIX F

Sample Lessons From Experimental Program

And Teacher Reaction Sheet

Session 10 Classification Training

Materials: one set of plastic fruit (one each--apple, banana, orange, lemon, peach, pear);
one yellow plastic airplane;
one red plastic airplane.

Objectives:

1. To introduce two new categories of objects, and give the children an opportunity to think about the various characteristics of fruit and airplanes.

2. To give them another opportunity to classify things across categories.

Procedure:

1. Identify and describe fruit.

   Present the pieces of fruit one at a time and ask children to describe them. Encourage them with questions such as:

   what do you call this?
   what color is it?
   how is it shaped?
   what do you do with it?
   how would it taste if you ate it?
   what do you do to eat it? (peel it, squeeze it, etc.)
   how does it feel when you touch it? (smooth, rough, fuzzy).

2. Discuss similarities and differences.

   Ask children in what way these things are all alike and bring out that:

   they are all supposed to be things to eat.
   they are all supposed to be fruit.
   they are not real fruit; they are all made of plastic.

   Ask questions to bring out the idea that the fruits differ in color, shape, texture, how you eat them.

3. Guessing game.

   Put pieces of fruit in bag; have children reach in the bag and, without looking, guess which piece of fruit they picked out. Encourage them to tell the

children how it feels.

4. Find something like me game.

   Hold up the lemon and ask children to find another piece of fruit that is like the lemon in some way. (e.g. yellow like the banana, juicy like the orange, bumpy or rough like the orange.)

5. Put out two airplanes and ask children to describe them.

   Bring out their similarities (both airplanes,both have wheels and wings, fly, carry people, are made of plastic, not real airplanes) and fact that they differ in color.

6. Sorting game.

   Put out apple, lemon, and two airplanes.

   Ask children to make two groups so that the two things in each group are alike in some way. (color or function). Then put the four things together and ask them to make another grouping so that the two things in each group are alike in a different way.

7. Ask children if they can think of some way in which all four things are alike.
   If they need a hint ask what the fruit and airplanes are made of.

Session 10: Language Development Training

Objectives:

1. To introduce two new categories of objects, and give the children an opportunity to think about the various characteristics of fruit and airplanes.

2. To give children a chance to talk about food and airplanes.

Materials: One set of plastic fruit (one each--apple, banana, lemon, orange, peach, pear)
One yellow plastic airplane
One red plastic airplane

Procedure:

1. Identify and describe fruit.

   Present the pieces of fruit one at a time and ask children to describe them. Encourage them with questions such as:

   What do you call this?
   What color is it?
   How is it shaped?
   What do you do with it?
   How would it taste if you ate it?
   What do you do to eat it? (peel it, squeeze it, etc.)
   How does it feel when you touch it? (smooth, rough, fuzzy)

2. Guessing game

   Put pieces of fruit in bag; have children reach in the bag and without looking guess which piece of fruit they pick out. Encourage them to tell the children how it feels.

3. Encourage stories about food.

   a. Ask children to tell about their favorite foods.

   b. Have children pretend they are going shopping. Some can be shoppers while others are people who work in the store. Or one can be a mother sending the children to the store.

4. Identify and describe airplanes.

5. Encourage stories about airplanes.

   Have the children pretend they are going on an airplane trip.

Ask questions such as:

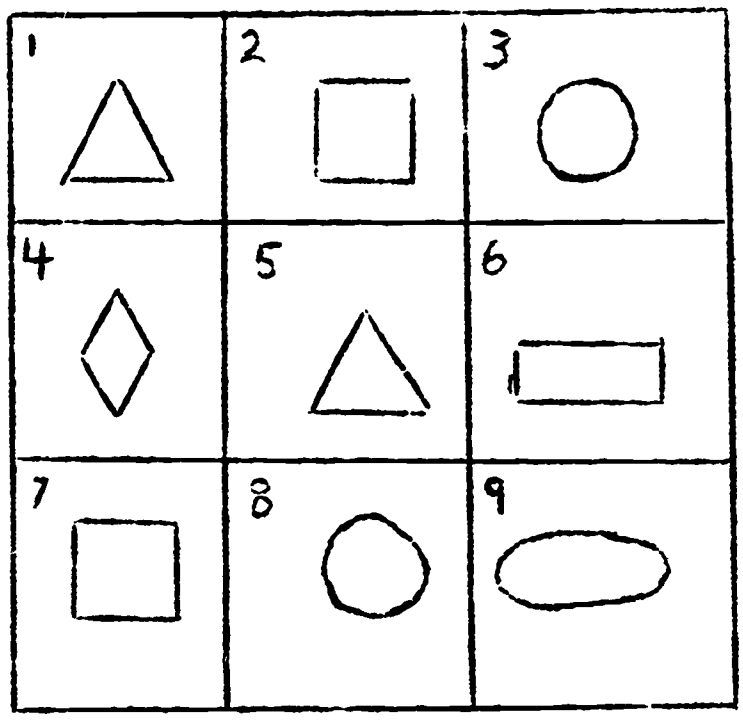
What would you do to get ready?
Where would you like to go?
What do you think you will see?
Suppose you flew over Bellevue School. What would you see?

Session 15 <u>Attention Training</u>

Purpose: To continue differentiation of identical and different using geometric shapes.

Materials:

four Bingo boards, 9" X 9", with shapes attached on one side, as illustrated, and with flannel on the other side.



1. red triangle
2. blue square
3. red circle
4. green diamond
5. yellow triangle
6. blue rectangle
7. green square
8. yellow circle
9. red oval

(The same shapes appear on all four cards but in different locations.)

Checkers or counting pieces to mark choices.

Construction paper shapes like the nine listed above.

Four sets of flannel pieces of various shapes and colors.

Procedure:

1. Show the poster board shapes one at a time and discuss with the group the characteristics of each. For example, hold up the red triangle and ask, "What can you tell me about this?" Children's observations may include color, shape, number of points, and number of sides. Continue in the same manner with the other eight shapes. Try to give each child an opportunity to respond individually.
2. "Now we are going to play a different kind of game using these shapes. Here is a card for each of you which has the same shapes on it. (Pass out bingo cards to the children.) Here are some markers for you to use in the game. (Place markers in the center of the table.) Each

of you may now take one marker." (Help children who do not understand directions.)

"Now, look at this. (Show red circle.) Find one just like this on your card. When you find it, put your marker on it." (Make sure the child finds the correct shape and understands how to put his marker on it. If he chooses the yellow circle or red oval, review the idea of identical and different.)

Show the shapes in the following order, following the above procedure until all children have all the shapes covered with markers.

2. green square
3. blue rectangle
4. yellow triangle
5. red oval
6. blue square
7. red triangle
8. yellow circle
9. green diamond

"You have found all the shapes and have them all covered. That is very good." "Now, take all the markers off your card and put them back in the box (or center of the table)."

3. "We are going to play the game a different way now. This time we want to see who can cover all the shapes in a row." (Show them the three rows across the board. Explain that if they cover all the shapes in any one of the three rows first, they will win the game.)

   Follow the procedure in part 2 by showing a shape and making sure each child covers the correct shape. Randomly select the shapes to be shown. Play the game at least four times to make sure each child has a chance to win at least once. The cards can be exchanged after the second time or each time.

   If interest persists and time allows, the game could be varied by covering one of the vertical columns. Collect markers.

4. Give each child a set of flannel pieces. Ask each child to find a flannel piece just like each shape on his bingo board. "Put the flannel piece on the shape when you find it." Demonstrate by showing a yellow flannel triangle. Then place the flannel triangle on one child's yellow triangle on his bingo board. Each child continues until he has found a flannel piece like each bingo shape.

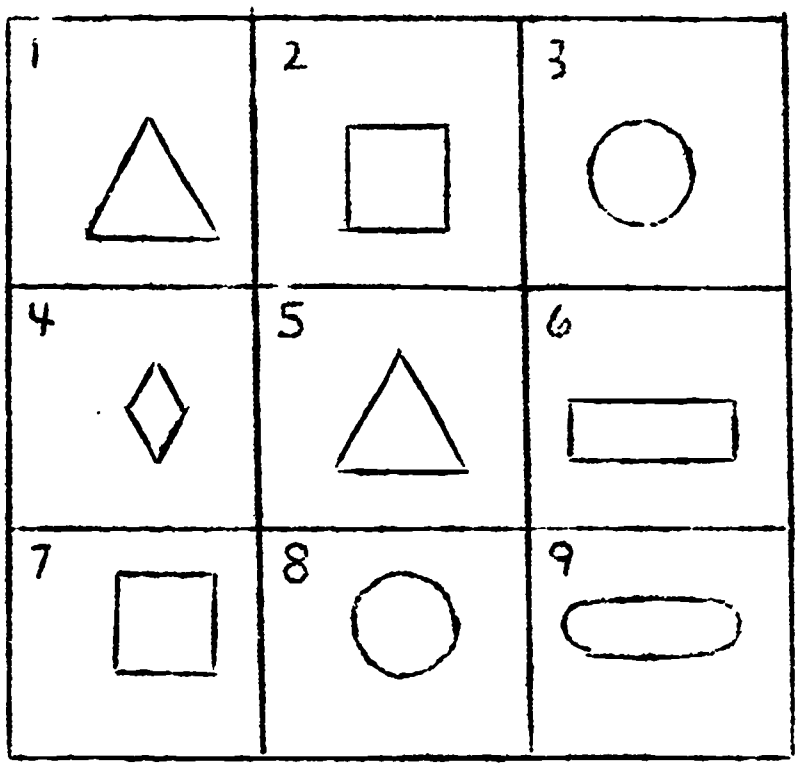
5. The children may use the flannel pieces to make designs on the flannel board side.

Session 15: Perceptual Motor Training

Purpose: To build designs on a flannel board using flannel pieces.

Materials:

Bingo board, 9" X 9", with shapes attached on one side and with flannel on the other side



1. red triangle
2. blue square
3. red circle
4. green diamond
5. yellow triangle
6. blue rectangle
7. green square
8. yellow circle
9. red oval

(The same shapes appear on all four cards but in different locations.)

Checkers or counting pieces to mark choices.

Construction paper shapes like the nine listed above.

Four sets of flannel pieces of various shapes and colors.

Procedures:

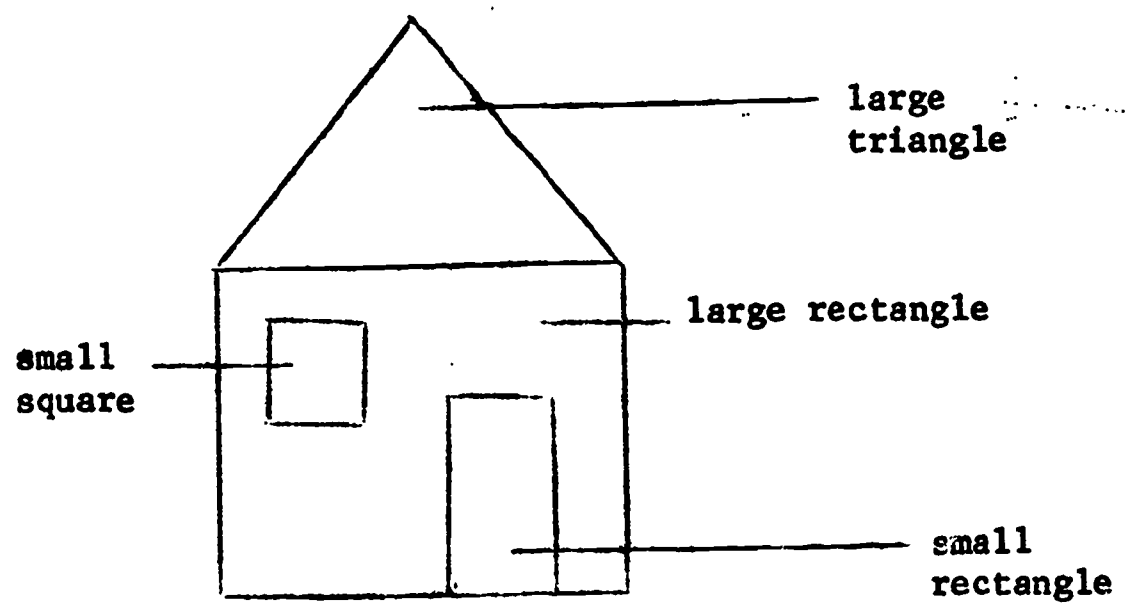
1. Use one of the flannel boards and one set of flannel shapes to demonstrate. "Today we are going to make some designs on this flannel board." If children have not previously used a flannel board, have them feel the texture of flannel and show them how the pieces will stay on the flannel board.

   "First, I'm going to use two pieces. I'll put this circle on first. (Place circle on the board.) Now, I'm going to put a triangle on like this. (See illustration.)

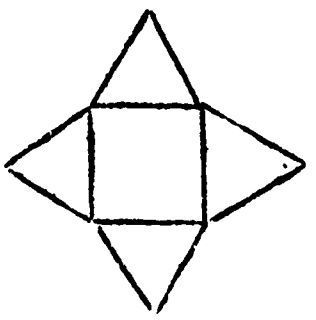
What do you think this looks like?" If children do not volunteer an ice cream cone, tell them that's what you had in mind. Accept any reasonable suggestions made by the children.

Remove the pieces from the flannel board. Give each child a flannel board and a set of pieces. Ask them to see if they can make an ice cream cone. Give help when needed so that each child understands how to make the design.

2. Use one child's materials to build a house like the illustration. Remove pieces and allow children to make a house, varying it in any way they desire.



3. Build an abstract design similar to the illustration. Remove pieces, then ask children to make designs similar to the one you made.



one square
four triangles

4. Allow children to make their own designs using any of the flannel pieces in the individual sets provided.

5. Collect all boards and pieces. Use the side with the colored shapes for this activity

"Now we're going to play a different game. I will show you what to do. Watch me. I'm going to close my eyes and point to one of the shapes." When a shape is located, open eyes. "What shape did I find?" Encourage children to help describe the shape.

"Now, you (point to one child), close your eyes and point to a shape." When he has pointed to one, ask him to open his eyes and tell about the shape selected. Continue the activity so that each child has at least one turn.

6. Sequencing game.

Use construction paper shapes. Place three shapes on the table. Ask children to remember how they are arranged. Pick up the pieces, hand them to a child, and ask him to lay them out in the order previously presented.

Reaction and Suggestion Form

Teacher's Name_____ Center_____

Date_____

PERCEPTUAL - MOTOR TRAINING - Session_____ _____
********** *****

Please comment concerning each of the following:

1. Children's response

2. Teacher's reactions

3. Length of session

4. Materials

5. Suggestions